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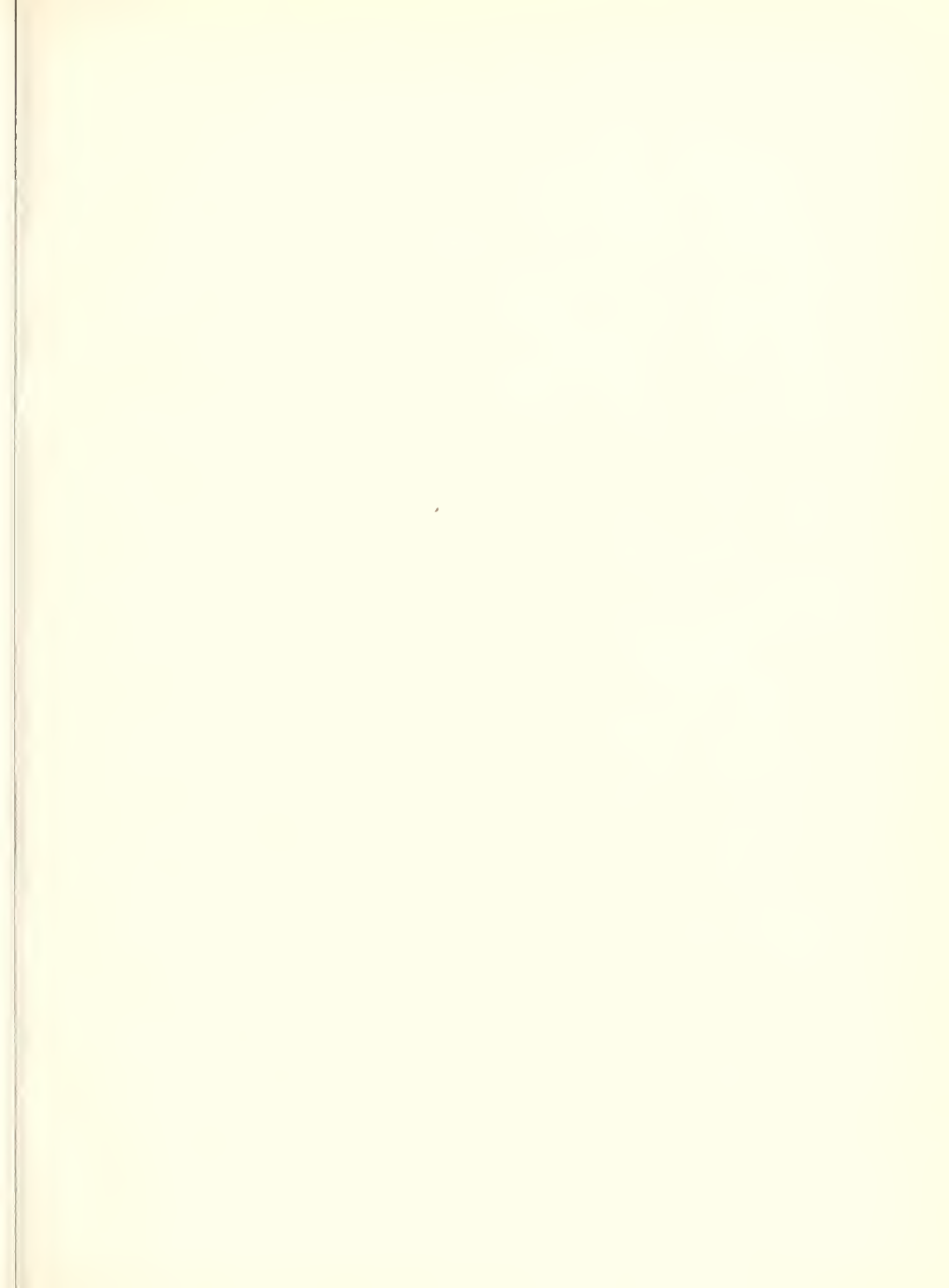
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(BOOK TITLE)

BLISTER RUST

CONTROL WORK

in the

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WHITE PINE BLISTER RUST CONTROL  
IN THE  
NORTHWESTERN REGION  
January 1 to December 31, 1943

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# WHITE PINE BLISTER RUST CONTROL IN THE NORTHWESTERN REGION

January 1 to December 31, 1943

Herman E. Swanson, Regional Leader

\* \* \* \* \*

## Introduction

Blister rust control work in the Northwestern Region is conducted under the general leadership and technical direction of the Bureau of Entomology and Plant Quarantine cooperating with the U. S. Forest Service, the National Park Service and state and private agencies. This section of the report dealing with the general blister rust situation in the Northwestern Region is followed by brief summaries of the work on:

1. State and private lands
2. National Forests
3. National Parks

In addition to these summaries, detailed operation reports covering individual territorial units are presented.

## 1943 Season

Progress. During 1943, a total of 36,747 acres were worked including 8,927 acres of initial work and 27,820 acres of reeradication. This is not an impressive accomplishment in view of the amount of work which needs to be done, but under the handicaps of the war emergency, the working of a township and a half of high priority white pine land and assuring its retention in white pine production is significant.

Labor. With the exception of 87 Italian internees and 26 Civilian Public Service workers, the only source of labor for blister rust control was from high school students. A large number of these 16 and 17 year old boys were secured from all sections of the country, the majority coming from the Northwest. At the peak of the season, approximately 1,530 boys were employed. A nucleus of experienced workers was lacking since eighteen years had constituted the minimum age for blister rust workers in previous years making all former seasonal workers subject to Selective Service. This situation made the problem of training and supervision more difficult. The effectiveness of the younger boys did not measure up to a normal crew and yet as the season progressed they shaped up to reasonably satisfactory units as evidenced by the weekly improvement in production and efficiency. By August they compared favorably with a standard crew. Unfortunately an exceptionally stormy month of June together with the early starting of school in the fall resulted in such a short season that the benefits of the training and accumulated experience of the boys were not fully utilized. Under the circumstances, these youthful workers are paying their way and even though they do not measure up to a standard crew, the work which they are performing now will accomplish more in the protection of white pine than if postponed to some future time.

Also this work is serving to protect and maintain white pine on high priority sites which otherwise would be lost due to the rapid build-up of pine infection.

The labor outlook for 1944 is much the same as in 1943 with the 16 and 17 year old boys representing the main source. The crews will be more efficient as most of the 16 year old and some of the 17 year old boys employed in 1943 will be back. This nucleus of trained and experienced workers represents a great improvement over conditions which existed at the start of the 1943 season when there were very few experienced workers available. There is some indication also that a few older boys or men may be available which will generally strengthen the crews.

Supervision and Checking. Experienced and capable camp superintendents were available for most camps. Deficiencies were met by preseason training of high school teachers and other qualified candidates. Very few checkers were available and those employees who were qualified were more urgently needed for direct supervision of the crew work. As a result, the regular check was only applied to the areas where there was an important need for such an inspection. On the other areas, a post check inside of about two years will be satisfactory. Efficiency of the crews was maintained by employment of the "gang formation" with the crew leader checking directly behind the crew. This made possible the close supervision of all crews by the camp superintendent and also enabled him to make daily checks on the efficiency of all crew work.

Infection Conditions. With blister rust heavily entrenched in the Inland Empire white pine type, the amount of pine infection is increasing from year to year. In 1943, the pine infection occurring in 1941 appeared. The great amount of this infection particularly on areas where infection was established in 1937 and on which ribes eradication had not been performed in the interim marks 1941 as being a most favorable year for spread of the rust from ribes to pine, equalling in intensity the heavy wave which occurred in 1937. The year 1937 was characterized not only by heavy spread of infection from ribes to pine but also by the generally heavy and long distance spread from pine to ribes which introduced blister rust into many new areas. In 1941, the spread from ribes to pine was equally or more severe but weather conditions in the spring of 1941 were not such as to permit the long distance spread from pine to ribes. This means that the serious infection build-up in 1941 occurred where there was close association of ribes to fruiting blister rust cankers.

Only a normal increase in pine infection is expected to have occurred in 1943. Field observations indicate that much of the ribes infection dissipated itself during the summer and except in localized areas where conditions were most favorable, the amount of telia developing on ribes was not great.

More information on infection conditions is to be found in the "Disease Investigations" report and in the reports for those operation which performed disease surveys in 1943.

## Review of Progress and Results from 1924-1943

The total work accomplishment in Idaho, Montana, and Washington to date is: 1,899,601 acres first working, 406,333 acres second working and 71,792 acres third working, making a total acreage of 2,377,731 reported initially worked and reworked. This required 2,044,554 effective man-days and 433,478,467 ribes were destroyed. Some 799,300 acres of worked area are reported as on maintenance with an additional 205,000 acres of mature stands placed in a deferred working status as not requiring ribes eradication before the areas are logged.

To a certain extent the above data indicate the accomplishments in protection of white pine from blister rust by showing the large amount of work which has been performed in the eradication of ribes, but these figures do not show satisfactorily what the real accomplishments have been and wherein the control program has not kept pace with the spread and intensification of blister rust. A complete presentation of the blister rust situation in the Northwestern Region will be possible upon the completion of the area classification survey initiated in the fall of 1943. At this time it is possible to review in general terms the present status of the entire problem.

Fundamentally, the problem of protecting white pine in this region divides itself into two phases: (1) the protection of established white pine stands, and (2) the protection of new stands of white pine coming in following logging or fires. This distinction is transitory because with the passage of time, new stands become well established and additional stands are originating annually on newly denuded areas. In discussing the present blister rust situation, it is convenient to consider the status in white pine stands 20 years old and older and in the new stands 0 to 20 years old. This division is significant because two important events occurred in this region 21 years ago in 1923; the first ribes eradication project was inaugurated and, as later determined, the first centers of blister rust on white pine originated in 1923.

It is important to realize what has happened in the forest itself during these 21 years. During this period, tree growth has changed the then existing small white pine seedlings to advanced reproduction, reproduction into pole size and pole size into young mature. (See illustration.) To a great extent the problem of ribes eradication and the difficulty of establishing control very indirectly with the age of the stand. Those who have struggled with the blister rust problem in these areas of varying age class have realized the changed conditions since ribes eradication was performed but the casual observer in the woods is inclined to view the more advanced age classes as they are now without realizing what they were like when the ribes were eradicated.

With these changing conditions in mind, one can better appreciate the fact that practically all stands 20 years old and older are now in good condition, either under permanent control or sufficiently well protected that another working or mop-up will complete the job. This reference does not include those outlying areas which are being dropped from the control area because blister rust damage had gone too far, and also a small amount of acreage dropped where initial eradication under the large CCC and WPA programs was



performed too late or facilities were not available for following through in sufficient time with necessary reeradication. These areas will stand as mute evidence of damage which might have occurred without ribes eradication throughout all the white pine type in all age classes.

If the white pine forests had remained undisturbed since 1923 when blister rust control work was started, the job of protection would have been completed. Such a supposition is farfetched because the changing aspect of the forests resulting from either logging or fire is inevitable. Nevertheless had the early planned programs of control been put into operation the white pine areas could have been entirely protected before blister rust became heavily entrenched and ahead of any great accumulation of cutover area coming back to white pine. Had this been the case, the job of control would have been less costly and the problem now would only be the relatively small one of protecting the new crop of white pine coming in after logging upon an average of 15,000 to 25,000 acres annually.

This was not the case and consequently over this 21 year period there has been a considerable acreage of new young white pine stands following logging and in some localities following fires occurring in the late twenties and early thirties. The heavy demand for white pine lumber for war purposes has added greatly to these cutover areas in the last three years. The problem of control on these lands is exceedingly difficult since ribes and pine come back together on these newly disturbed areas.

As compared to the very favorable protection conditions in stands over 20 years old, the situation in the 0-20 year age class is serious and complex. This young age class is taking an ever increasing proportion of the control effort and now is requiring most of the work. It is difficult to generalize on the protection status in these areas since this age class represents the critical stage and in most cases requires three workings spaced through the period to establish control. Progress in this direction varies from no workings in the more recent cuttings to one and in some cases two or three workings in the 15-20 year class. The degree of protection will vary accordingly with those stands at the top of the age class which have received the necessary workings being in good condition. The progress of control in these young stands is far behind schedule particularly due to the inadequacy of the control program during the last four or five years. The seriousness of this situation must be emphasized because the long term management and perpetuation of white pine depend upon the protection of these young stands, and also the elimination of the necessity for ribes eradication on the next stand rotation is dependent upon the removal of the present ribes crop before a substantial volume of seed is dropped.

In all cases it is not feasible or practical to attempt blister rust control on cutover areas. On areas where hundreds or thousands of ribes per acre come in immediately following logging and spread infection to a high percentage of the pine seedlings as soon as they appear, the high costs of ribes eradication are out of proportion to the possibilities of saving sufficient pine. There are also those areas which brush will take over if the first crop of white pine seedlings is lost. Such areas, if they represent a high quality white pine site are placed in a deferred classification. If the agency owning





W-313. Logged in 1915, turned over in 1917. Picture taken in 1931. Rubus eradicated in 1933 and 1941.



W-313-11. Same area in 1942 protected from blister rust - with 500 to 1,000 white pine per acre.



this land desires to grow white pine on it, one solution is a controlled broadcast burn followed by planting. A clean burn will reduce the ribs to practically nothing. Recent developments along the lines of direct seeding of white pine indicate that planting may be greatly simplified and be performed at a fraction of the present cost.

On the other hand, there are some favorable factors which make possible the protection of white pine and its perpetuation on cutover areas. There is considerable acreage on which the number of white pine seedlings is so great that losses from blister rust due to the long intervals between ribs eradication work are not causing damage to the stocking in the stand. Another condition which is not uncommon, is the long period over which white pine continues to come in on areas after logging or fire. This is evidenced by the results of disease surveys and field inspections which show new white pine germinating after 15 and 20 years. This is important where it has not been possible to follow through with control work on schedule because many areas examined show more new pine coming in than have become infected with the rust.

*Redwood  
new seed  
from  
1950  
40 ft  
Q. 21*

#### Area Classification

The above discussion would be more informative if supported by acreage figures applying to the various problems. Such information is now being assembled from the results of an area classification survey made in the fall of 1943 by the permanent staff of the Spokane Blister Rust Control Office assisted by personnel of the U. S. Forest Service.

Although work areas had been carefully selected in the year to year planning, a re-evaluation of the entire white pine control area was needed particularly since the control program was falling behind necessitating some retrenchment, establishing working priorities, and focusing of control efforts on the more valuable white pine area. A set of area classifications based upon the pine producing qualities of an area and the feasibility of establishing protection from blister rust was developed. In making these classifications, the suitability of the area in the long term management for white pine was given consideration. At this writing it is possible to state that there will be a considerable reduction in the size of the control area primarily from the change of site characteristics caused by logging or the existence of a heavy residual stand of other species after the removal of the mature white pine. The status of the latter areas will depend upon the future utilization of these other tree species and the subsequent management of the lands. Thus far, the acreage lost due to blister rust has not been large, but the loss has been serious. Most of the acreage in this category which is being dropped is the additions made to the control area in 1938 on which no ribs eradication work has ever been performed.

#### Area Classes

Class. Designation applied to an area based on its white pine producing value or its relation to the blister rust control work program. The classes fall into three categories, work areas (highest priority in protection, classes 1, 2), deferred areas (classes 3, 3A, 4, 5, 5A, 5AA), dropped areas (classes 3B, 4A, 5B, 6).

Class 1. Areas predominately well stocked with thrifty white pine of reproduction or pole size which can be protected at a reasonable cost. Class 1 areas are expected to produce a white pine volume of 20,000 bd. ft. or more per acre. Individual appraisal in which the various factors or combination of factors are considered must be relied upon in making area classifications. As a general guide for stands of normal composition and even distribution of species, the following stocking of dominant and codominant white pine at various ages may be expected to yield 20,000 bd. ft. per acre at maturity.

<u>Age or diameter</u>	<u>White pine trees per acre</u>
0-10 yrs.	400
30 yrs. (4" d.b.h.)	120
50 yrs. (8" d.b.h.)	90
80 yrs. (12" d.b.h.)	70

Class 2. Areas sufficiently stocked with thrifty white pine of reproduction or pole size which warrant the cost of protection. Class 2 areas are expected to produce between 10,000 bd. ft. and 20,000 bd. ft. per acre and would be included in all work programs. This class of area would not measure up to class 1 in pine stocking, site, cost of protection, and feasibility of control. As in the case of class 1, individual appraisal must be relied upon. As a general guide, the following stocking of dominant and codominant white pine at various ages may be used to represent requirements necessary to produce 10,000 bd. ft. per acre at maturity.

<u>Age or diameter</u>	<u>White pine trees per acre</u>
0-10 yrs.	200
30 yrs. (4" d.b.h.)	70
50 yrs. (8" d.b.h.)	40
80 yrs. (12" d.b.h.)	30

Class 3. Potential white pine areas not supporting adequate stocking or an adequate source of seed. Under present conditions, areas would not warrant blister rust control but because of the possibilities of their becoming good white pine areas through planting or natural seeding they are held in a deferred status.

Class 3A. Areas of reproduction or pole not supporting sufficient white pine to meet class 1 and 2 standards. Class 3A is to take care of stands with light stocking of white pine on which the growth of other species has eliminated further establishment of white pine through planting or natural seeding. Class 3A would be retained in the control area if it is already on maintenance or a low cost ribes eradication job is commensurate with the pine values present.

Class 3B. Understocked white pine stands which do not warrant cost of protection and should be dropped from the control area.

Class 4. Areas comparable to classes 1 and 2, except that the cost of control work and the heavy pine infection make it inadvisable to attempt control under the present program.

Class 4A. Class 4 areas dropped from control area.

Class 5. Areas of mature or pole size white pine on which working is deferred.

Class 5A. Cutover areas supporting heavy residual stand of trees other than white pine on which control work is deferred awaiting further cutting or disposal before being reclassified.

Class 5AA. White pine cutover areas with little or no residual stand or white pine seed trees which have definite possibilities of reproducing to white pine and have a high priority in long term white pine management. This class of area may be worked when necessary to save first crop white pine seedlings.

Class 5B. White pine cutover areas which will not come back to white pine and are dropped from the control area.

Class 6. Non-white pine type and areas of poor site, high elevation, rocky, etc., which should be dropped from the control area.

#### Conclusion

The blister rust control problem in the Northwestern Region is serious because of the primary position which white pine occupies in the timber industry of the Inland Empire and the economic dependency of the region on this industry. The successful prosecution of a control program for the protection of white pine is dependent on a stabilized annual project which will permit the carrying through to completion any work that is started.

A field force of approximately 3,500 to 4,000 men working an average of four months during the field season for a period of five years is necessary to gain permanent protection in the white pine stands in the present control area of Idaho, Montana and Washington. After existing stands are placed on a maintenance basis, the future control job will revert to a small scale project of protecting a few thousand acres of cutover land which is logged annually and performing maintenance work in stream type.



TABLE 1

PROGRESS OF RIBES ERADICATION IN THE NORTHWESTERN REGION IN 1943

State	Ownership	Acres Worked			
		First	Second	Third	Total
Idaho	National Forests	4,035	7,282	3,487	14,804
	Public Domain	160	270	837	1,267
	State	120	2,013	1,024	3,157
	Private	1,299	4,406	3,157	8,862
	Total	5,614	13,971	8,505	28,090
Montana	National Forests	2,437	531	339	3,407
	National Parks	302	86		388
	Private	256	171		427
	Total	3,045	788	339	4,222
Washington	National Forests	268	2,623	1,119	4,010
	National Parks			425	425
	Total	268	2,623	1,544	4,435
Total	National Forests	6,790	10,436	4,995	22,221
	National Parks	302	86	425	813
	Public Domain	160	270	837	1,267
	State	120	2,013	1,024	3,157
	Private	1,555	4,577	3,157	9,289
	Total	8,927	17,382	10,438	36,747

TABLE 2

## RIBES ERADICATION IN THE NORTHWESTERN REGION, 1923-1943

	State	Ownership	Acres Worked				Acres Unworked	Acres Deferred	Total White Pine Area
			First	Second	Third	Total			
Idaho	Nat. Forest	871,361	203,626	27,135	1,102,122	202,275	56,454	1,130,090	
	Pub. Domain	16,642	5,840	1,039	23,521	13,908	1,040	31,590	
	State	264,138	50,110	8,892	323,140	48,782	32,030	344,950	
	Private	490,994	103,007	20,306	614,307	215,004	95,027	801,025	
	Total	1,643,135	362,583	57,372	2,063,090	479,969	184,551	2,307,655	
Montana	Nat. Forest	108,715	7,944	2,244	118,903	37,700	17,468	163,883	
	Nat. Parks	3,197	817		4,014	6,303		10,000	
	Pub. Domain	40			40			40	
	State	734	1		735	234		968	
	Private	18,993	2,056	1,374	22,423	14,366	2,490	35,849	
	Total	131,679	10,818	3,618	146,115	59,103	19,958	210,740	
Washington	Nat. Forest	69,708	16,371	1,752	87,831	29,602		99,310	
	Nat. Parks	8,254	5,028	4,369	17,651			8,254	
	Pub. Domain	315	60		375			315	
	State	6,832	3,935	2,114	12,881	3,018		9,850	
	Private	39,678	7,593	2,567	49,838	11,942		51,620	
	Total	124,787	32,987	10,802	168,576	44,562		169,349	
Subtotal	Nat. Forest	1,049,784	227,941	31,131	1,308,856	269,577	73,922	1,393,283	
	Nat. Parks	11,451	5,845	4,369	21,665	6,303		18,254	
	Pub. Domain	16,997	5,900	1,039	23,936	13,908	1,040	31,945	
	State	271,704	54,046	11,006	336,756	52,034	32,030	355,768	
	Private	549,665	112,656	24,247	686,568	241,312	97,517	888,494	
	Total	1,399,601	406,388	71,792	2,377,781	583,634	204,509	2,687,744	
Colo- rado	Nat. Forest	14,859	1,962		16,821	184,141		199,000	
	Nat. Parks					7,000		7,000	
	Total	14,859	1,962		16,821	191,141		206,000	
	Nat. Forest	21,760			21,760	200,240		222,000	
	Nat. Parks					18,700		18,700	
Wyoming	Indian Res.					11,000		11,000	
	Total	21,760			21,760	229,940		251,700	
	Nat. Forest	36,619	1,962		38,581	384,331		421,000	
	Nat. Parks					25,700		25,700	
	Indian Res.					11,000		11,000	
	Total	36,619	1,962		38,581	421,081		457,700	
Total North- western Region	Nat. Forest	1,086,403	229,903	31,131	1,347,437	653,958	73,922	1,814,283	
	Nat. Parks	11,451	5,845	4,369	21,665	32,503		43,954	
	Pub. Domain	16,997	5,900	1,039	23,936	13,908	1,040	31,945	
	Indian Res.					11,000		11,000	
	State	271,704	54,046	11,006	336,756	52,034	32,030	355,768	
	Private	549,665	112,656	24,247	686,568	241,312	97,517	888,494	
	Total	1,936,220	408,350	71,792	2,416,362	1,004,715	204,509	3,145,444	

## Allotments and Expenditures

Federal funds for white pine blister rust control are contained in the Agricultural Appropriation Act and are allotted to the various federal agencies carrying on blister rust control. Additional funds are contributed by state and private agencies to be used with federal funds for work on state and private lands.

	<u>Fiscal Year</u> <u>1943</u>	<u>Fiscal Year</u> <u>1944</u>
<u>Federal Allotments:</u>		
Entomology and Plant Quarantine:		
Work Project BLR-1-4	\$ 83,500.00	\$ 80,000.00
Work Project BLR-3-4	<u>75,195.00</u>	<u>56,088.00</u>
Subtotal	\$158,695.00	\$136,088.00
Forest Service:		
Financial Project BLR-4	\$641,474.00	\$550,000.00
National Park Service:		
Financial Project BLR-5	\$ <u>24,190.00</u>	\$ <u>12,755.50</u>
Total Federal Allotments	\$824,359.00	\$693,843.50

## State and Private Funds: (Deposited with U. S. Treasury)

State of Idaho	\$22,106.35	\$10,000.00
Clearwater Timber Protective Assn.	6,000.00	6,781.18**
Potlatch Timber Protective Assn.	5,200.34	4,959.06*
Priest Lake Timber Protective Assn.	<u>4,240.44</u>	<u>4,257.42*</u>
Total State and Private Funds	\$37,547.13	\$25,999.66

\* In process of transfer to U. S. Treasury

\*\* \$386.68 deposited. Balance in process of transfer to U. S. Treasury

## Expenditures - Calendar Year, 1943

	<u>Idaho</u>	<u>Montana</u>	<u>Washington</u>	<u>Total</u>
Entomology and Plant Quarantine:				
Work Project BLR-1-4	\$ 72,517.46	\$ 8,177.87	\$ 5,813.55	\$ 86,508.88
Work Project BLR-3-4	<u>102,268.99</u>			<u>102,268.99</u>
Total	\$174,786.45	\$ 8,177.87	\$ 5,813.55	\$188,777.87
Forest Service BLR-4:	\$355,780.60	\$42,200.99	\$37,508.34	\$435,489.93
National Park Service BLR-5:		\$ 1,090.34	\$14,937.34	\$ 16,027.68
Subtotal Federal Expenditures	\$530,567.05	\$51,469.20	\$53,259.23	\$640,295.48
State and Private BLR-3-4:				
State	\$ 12,252.13			\$ 12,252.13
Private	<u>386.68</u>			<u>386.68</u>
Total	\$ 12,638.81			\$ 12,638.81
Grand Total	\$543,205.86	\$51,469.20	\$58,259.23	\$652,934.29



## Expenditures - 1922-1943

### Bureau of Entomology and Plant Quarantine: (1922-1943)

<u>State</u>	<u>Regular</u>	<u>ERA(WPA)</u>	<u>NIRA(PWA)</u>	<u>Total</u>
Idaho	\$1,513,622.06	\$3,002,140.71	\$ 470,841.62	\$4,986,604.39
Montana	219,749.87	196,847.11	83,306.79	504,903.77
Washington	<u>232,584.51</u>	<u>459,112.87</u>	<u>105,199.60</u>	<u>796,896.98</u>
Subtotal	\$1,965,956.44	\$3,658,100.69	\$ 664,348.01	\$6,288,405.14
Colorado	11,852.04	59,396.51	8,041.45	79,230.00
Wyoming	<u>11,314.28</u>	<u>58,283.96</u>	<u>7,107.41</u>	<u>76,705.65</u>
Subtotal	\$ 23,166.32	\$ 117,680.47	\$ 15,148.86	\$ 155,995.65
Grand Total	\$1,989,122.76	\$3,775,781.16	\$ 679,496.87	\$6,444,400.79

### Forest Service: (1930-1943)

<u>State</u>	<u>Regular</u>	<u>ERA(WPA)</u>	<u>NIRA(PWA)</u>	<u>Total</u>
Idaho	\$3,277,459.60	\$ 421,155.19	\$1,369,184.16	\$5,067,798.95
Montana	257,011.64	136,851.46	149,858.06	543,721.16
Washington	<u>210,067.76</u>	<u>                    </u>	<u>134,320.68</u>	<u>344,388.44</u>
Total	\$3,744,539.00	\$ 558,006.65	\$1,653,362.90	\$5,955,908.55

### National Park Service: (1930-1942)

<u>State</u>	<u>Regular</u>	<u>Total</u>
Montana	\$ 9,845.76	\$ 9,845.76
Washington	<u>54,392.07</u>	<u>54,392.07</u>
Total	\$64,237.83	\$64,237.83

### State and Private: (1928-1943)

<u>State</u>	<u>State</u>	<u>Private</u>	<u>Total</u>
Idaho	\$174,705.04	\$119,967.49	\$294,672.53*

\*Funds deposited with U. S. Treasury and expended by the Bureau of Entomology and Plant Quarantine

## Omnibus Tables

Complete summaries of blister rust control work are presented in the following tables. CCC work is valued at \$1.50 per man-day on control work. Values are also placed on contributed service by state and private agencies and are listed as "indirect aid," while "direct aid" refers to funds deposited with the U. S. Treasury together with a small amount of direct service on the ribes eradication program performed by the state of Idaho.



TABLE 1

## SUMMARY OF 1943 RIBES ERADICATION

State	Initial Eradication Work			Reeradication Work			Totals		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days
Idaho	5,614	1,075,212	9,173	22,476	1,697,881	28,376	28,090	2,773,093	37,549
Montana	3,045	400,428	3,130	1,177	77,584	1,560	4,222	478,012	4,690
Washington	268	164,216	539	4,167	375,207	4,320	4,435	539,423	4,859
Total	8,927	1,639,856	12,842	27,820	2,150,672	34,256	35,747	3,790,528	47,098

State	Ribes Per Acre		Man-Days Per Acre		Number of Camps			Number of Employees		
	Eradication	Reeradication	Initial Eradication	Initial Reeradication	C.P.S.	Reg.	Total	Laborers		Total Employees
								C.P.S.	All Supervision	
Idaho	192	76	1.63	1.26		29	29	1,374	1,374	44
Montana	132	66	1.03	1.33	1	3	4	26	139	5
Washington	613	90	2.01	1.04		3	3	105	105	5
Total	184	77	1.44	1.23	1	35	36	26	1,618	54
										1,698

TABLE 2

SUMMARY OF 1943 RIBES ERADICATION - BY PROGRAMS  
(Including all work - initial and reeradication)

State	Regular and Cooperative			C.P.S.		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days
Idaho	28,090	2,773,093	37,549			
Montana	3,034	539,387	3,719	338	138,645	971
Washington	4,435	539,423	4,859			
Total	36,359	3,651,883	46,127	338	138,645	971



TABLE 3  
SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP - 1943

Land Ownership	Initial Eradication			Reeradication			Totals		
	Acres Worked	Number Ribes Destroyed	8-Hour Man-Days	Acres Worked	Number Ribes Destroyed	8-Hour Man-Days	Acres Worked	Number Ribes Destroyed	8-Hour Man-Days
National Forests R-1	6,790	1,237,152	10,468	15,431	947,316	18,335	22,221	2,284,468	28,803
Other Public Domain	160	11,703	157	1,107	63,150	1,703	1,267	74,853	1,865
National Parks	302	103,559	771	511	86,124	1,570	813	189,683	2,341
Subtotal Federal	7,252	1,412,421	11,396	17,049	1,107,190	21,613	24,501	2,549,011	33,009
State and Private	1,675	227,435	1,446	10,771	1,013,482	12,843	12,446	1,240,917	14,093
Grand Total	8,927	1,639,856	12,842	27,820	2,120,672	34,456	36,947	3,790,518	47,093
NATIONAL PARKS									
Mt. Rainier				425	51,038	1,370	425	51,038	1,370
Gilkey	302	103,559	771	86	35,086	200	388	138,645	971
Total	302	103,559	771	511	86,124	1,570	813	189,683	2,341
STATE AND PRIVATE LANDS									
Idaho	1,419	193,566	1,227	10,600	1,004,308	12,345	12,019	1,203,874	13,572
Montana	256	27,869	219	171	9,174	293	427	37,043	517
Total	1,675	227,435	1,446	10,771	1,013,482	12,638	12,446	1,240,917	14,089
NATIONAL FORESTS									
Clearwater	1,225	646,343	3,349	376	54,651	993	1,601	701,994	4,342
St. Joe				4,413	234,850	6,342	4,413	234,850	6,342
Coeur d'Alene	1,220	126,719	2,456	2,348	167,491	3,436	3,568	294,210	5,958
Antelope	1,738	234,500	1,923	7,374	497,600	6,442	9,112	732,100	8,365
Cablot	4,487	229,000	2,140	920	33,324	1,056	3,407	302,324	3,206
Total	6,790	1,237,152	10,468	15,431	947,316	18,335	22,221	2,284,468	28,803

TABLE 4  
SUMMARY OF ALL OTHER CONTROL WORK FOR 1943

States	Mapping Control Areas		Treatment of Infected White Pines			
	Number Acres Mapped (R.P. & Prot. Zones)	Number 8-Hour Man-Days	Total Number Pines Examined	Number Infected Pines Cut Down	Number Infected Pines From Which Caners Removed	Number 8-Hour Man-Days
Idaho	373,290	969	117,725	9,418	47,090	277
Montana	96,500	120	2,150	175	950	48
Washington	20,600	83	110,220	8,209	44,121	390
Total	490,390	1,162	230,095	17,802	92,161	715

TABLE 5  
SUMMARY OF EXPENDITURES FOR 1943

States	Total			Recapitulation of Federal Funds				
	Federal (All Agencies)	State (Including All Coop. Funds)	Grand Total	Regular Funds				
				Bureau of Entomology and Plant Quarantine Leadership & Coord. (3101)	Lee Act (3103)	Forest Services	National Parks	Total Regular Funds
Idaho	\$530,567.05	\$14,088.81	\$544,655.86	\$72,517.46	\$102,268.99	\$355,780.60		\$530,567.05
Montana	51,469.20	2,500.00	53,969.20	8,177.87		42,200.99	\$ 1,090.34	51,469.20
Washington	59,259.23	1,000.00	60,259.23	5,813.55		37,508.34	14,337.34	59,259.23
Total	\$640,295.48	\$17,588.81	\$657,884.29	\$86,508.88	\$102,268.99	\$435,489.93	\$16,027.68	\$640,295.48
Financial Projects								
States	ELR-1 - Leadership, Coordination and Technical Direction			ELR-3 - Cooperative Blister Rust Control on State and Privately-Owned Lands			ELR-4 Forest Services	ELR-5 National Parks
	Indirect Aid State*	Federal Regular	Total	Direct Aid State*	Federal Regular	Total		
Idaho	\$ 450.00	\$72,517.46	\$72,967.46	\$13,638.81	\$102,268.99	\$115,907.80	\$355,780.60	
Montana	2,500.00	8,177.87	10,677.87				42,200.99	\$ 1,090.34
Washington	1,000.00	5,813.55	6,813.55				37,508.34	14,337.34
Total	\$3,950.00	\$86,508.88	\$90,458.88	\$13,638.81	\$102,268.99	\$115,907.80	\$435,489.93	\$16,027.68

\*Including all local cooperative funds.



## SUMMARY OF ALL RIBES ERADICATION 1918-1943 (INCLUSIVE)

State	Initial Eradication Work				Reeradication Work			
	Gross Acreage Reported Initially Worked	Net Acreage Worked in Control Area	Number Ribes Destroyed	Number 8-Hour Man-Days	Gross Acreage Reported Reworked	Net Acreage Reworked in Control Area	Number Ribes Destroyed	Number 8-Hour Man-Days
						1st Rework	Other Reworkings	
Ideho	1,643,135	1,643,135	321,865,807	1,330,775	419,955	362,583	57,372	57,827,547
Montana	131,679	131,679	17,116,705	93,494	14,436	10,618	3,818	1,856,996
Washington	124,787	124,787	25,716,441	105,225	43,749	35,987	10,802	5,122,563
Subtotal	1,899,501	1,899,501	365,698,461	1,529,494	478,140	408,388	71,752	65,792,005
Colorado	14,859	14,859	410,649	6,232	1,362	1,362		86,866
Wyoming	21,760	21,760	1,085,771	6,340				36,888
Subtotal	36,619	36,619	1,426,420	12,572	1,362	1,362		123,754
Total	1,936,220	1,936,220	369,124,881	1,542,066	480,142	409,750	71,752	65,915,759

State	Initial and Reradication					Per Acre			
	Gross Initial and Reworked Acreage Reported	Net Acreage			Number Ribes Destroyed	Ribes	Initial Ered.	Initial Ered.	Men-Days
		Initial	1st Rework	Other Reworkings	8-Hour Man-Days	Initial Ered.	Red.	Initial Ered.	Red.
Ideho	2,063,090	1,643,135	362,583	57,372	379,620,354	1,788,483	196	138	.91
Montana	146,115	131,679	10,618	3,818	15,943,601	111,277	130	127	.71
Washington	168,975	124,787	35,987	10,802	34,844,818	144,724	730	140	.84
Subtotal	2,377,733	1,899,501	408,388	71,752	439,408,487	2,044,584	194	138	.91
Colorado	16,921	14,859	1,962		427,535	6,356	28	44	.42
Wyoming	21,760	21,760			1,085,771	6,340	50		.32
Subtotal	38,681	36,619	1,962		1,513,306	13,696	41	44	.36
Total	2,416,414	1,936,220	409,350	71,752	440,941,793	2,058,450	191	137	.90

TABLE 2A

## STATUS OF BLISTER RUST CONTROL, 1918-1943, (INCLUSIVE)

State	Acreage of White Pine in Net Control Area	Acreage of Net Control Area (White Pine and Protection Zones)	Acreage of Net Control Area Initially Worked	Acreage of Net Control Area Reworked		Percentage Initially First Rework	Acreage in Net Control Area Still Needing Initial Protection	Acreage in Net Control Area Now on Maintenance Basis*
				1st Rework	Other Reworkings			
Ideho	2,123,104	2,123,104	1,643,135	362,583	57,372	77.4	17.1	479,969
Montana	190,792	190,792	131,679	10,618	3,818	69.0	5.7	69,103
Washington	169,349	169,349	124,787	35,987	10,802	73.7	19.5	44,566
Subtotal	2,483,235	2,483,235	1,899,601	408,388	71,752	76.5	16.4	583,634
Colorado	206,000**	206,000**	14,859	1,962		7.21	.35	19,141
Wyoming	231,700**	231,700**	21,760			8.65		23,840
Subtotal	437,700	437,700	36,619	1,962		8.00	.43	42,981
Total	2,940,335	2,940,335	1,936,220	409,350	71,752	65.8	13.9	1,004,715

\*Maintenance - Any area on which the ribes are so scarce that danger from blister rust is negligible for an indefinite period. To assure the continuation of this safe condition requires periodic examinations and in some instances ribes eradication by scouting methods.

\*\*Indefinite

TABLE 3A

SUMMARY OF ALL RIBES ERADICATION BY PROGRAMS 1918-1943 (INCLUSIVE)  
(Initial and Reradication)

State	Regular and Cooperative*				Emergency W.P.A. and E.R.A.			
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Number 8-Hour Man-Days
Ideho	619,865	102,449,770	506,450	500,970	91,269,072	411,890		
Montana	26,831	3,365,958	28,656	57,900	6,300,829	41,591		
Washington	34,165	8,225,070	29,871	33,973	13,635,288	53,107		
Subtotal	680,861	114,540,808	564,947	599,743	111,205,189	506,588		
Colorado			16,921	497,535	5,356			
Wyoming			21,760	1,085,771	6,340			
Subtotal			38,681	1,583,306	13,696			
Total	680,861	114,540,808	564,947	637,384	112,785,495	520,484		

State	Emergency C.C.C., S.C.S. and C.P.S.			Emergency P.W.A. or N.R.A.			Total Emergency Program		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man-Days
Ideho	590,414	123,729,240	661,693	361,841	68,242,272	208,450	1,443,225	277,240,584	1,282,033
Montana	17,495	1,934,495	16,244	43,988	6,846,309	24,816	119,884	15,077,633	82,651
Washington	33,888	4,790,400	37,397	61,150	8,206,754	24,419	154,411	26,619,442	114,923
Subtotal	641,198	130,444,135	715,334	466,979	77,291,335	257,685	1,718,501	318,930,659	1,477,607
Colorado						16,921	497,535	6,356	
Wyoming						21,760	1,085,771	6,340	
Subtotal						38,681	1,583,306	13,696	
Total	641,198	130,444,135	715,334	466,979	77,291,335	257,685	1,718,501	320,520,961	1,491,607

\*This includes work of the Bureau, cooperating state and private agencies, Forest Service and Interior Department work with regular funds.





TABLE 4A

## SUMMARY OF BIRDS EXAMINATION BY LAND OWNERSHIP 1918-1943 (INCLUDES)

Land Ownership	Acreage of White Pine in Set Control Area	Red Control Area	Total Acreage in (Set A Prot. Zones)	Gross Acreage Reported Initially Worked	Initial Control Area	Initial Number Ribs	Gross Number Ribs 8-Hour Man-Days	Gross Acreage Reported 8-Hour Man-Days	Gross Initial Acreage Reported	Gross Initial Acreage Reported	Totals (Initial & Rework)						
											Initial	Lat	Other	Reworked			
National Forests R-1	1,313,361	1,313,361	2,626,722	1,043,734	1,043,734	218,174,958	947,429	259,072	227,941	31,131	250,133,962	1,240,903					
National Forests R-2, 4	421,000*	421,000*	842,000*	36,619	1,459,420	13,432	1,582	1,582	1,582	36,619	1,496,039	1,582					
Other Public Domain	1,300,905	1,300,905	2,601,810	1,043,734	1,043,734	218,174,958	947,429	259,072	227,941	31,131	250,133,962	1,240,903					
National Parks	43,954	43,954	87,908	11,451	2,819,272	13,432	1,582	1,582	1,582	11,451	2,830,723	1,582					
National Reservations	1,313,361	1,313,361	2,626,722	1,043,734	1,043,734	218,174,958	947,429	259,072	227,941	31,131	250,133,962	1,240,903					
State and Private	1,114,715	1,114,715	2,229,430	821,359	1,459,420	13,432	1,582	1,582	1,582	821,359	1,480,881	1,582					
Grand Total	2,940,985	2,940,985	5,881,970	1,043,734	1,043,734	218,174,958	947,429	259,072	227,941	31,131	250,133,962	1,240,903					
NATIONAL PARKS																	
Mount Rainier	8,254	8,254	16,508	8,254	1,650,507	10,070	9,377	9,377	9,377	8,254	1,658,762	10,070	12,451	9,377	4,369	2,186,482	20,290
Olympic	10,000	10,000	20,000	3,197	4,444,555	3,955	817	817	817	3,197	4,447,752	3,955	4,014	3,197	317	4,451,261	7,912
Yellowstone	12,900	12,900	25,800	3,197	4,444,555	3,955	817	817	817	3,197	4,447,752	3,955	4,014	3,197	317	4,451,261	7,912
Grand Teton	5,800	5,800	11,600	5,800	1,160,000	10,070	9,377	9,377	9,377	5,800	1,165,877	10,070	12,451	9,377	4,369	2,186,482	20,290
Rocky Mountain	47,524	47,524	95,048	11,451	2,819,272	13,432	1,582	1,582	1,582	11,451	2,830,723	1,582	11,451	5,845	4,369	2,836,538	25,183
Total	43,254	43,254	86,508	32,503	11,451	11,451	11,451	11,451	11,451	11,451	11,451	11,451	11,451	11,451	11,451	11,451	11,451
INDIAN RESERVATIONS																	
STATE AND PRIVATE LANDS																	
Idaho	1,018,918	1,018,918	2,037,836	755,132	1,792,968	126,341,410	491,021	132,315	132,315	126,341,410	126,341,410	179,534	937,447	755,132	132,315	208,168	154,446,168
Montana	34,327	34,327	68,654	19,727	2,819,272	13,432	1,582	1,582	1,582	19,727	2,839,004	1,582	1,582	1,582	1,582	1,582	1,582
Washington	61,470	61,470	122,940	46,510	1,459,420	13,432	1,582	1,582	1,582	46,510	1,472,932	1,582	1,582	1,582	1,582	1,582	1,582
Total	1,114,715	1,114,715	2,229,430	821,359	1,459,420	13,432	1,582	1,582	1,582	821,359	1,480,881	1,582	1,582	1,582	1,582	1,582	1,582
NATIONAL FORESTS																	
Clearwater	195,870	195,870	391,740	151,097	1,510,970	126,341,410	491,021	132,315	132,315	126,341,410	126,341,410	179,534	937,447	755,132	132,315	208,168	154,446,168
St. Joe	300,991	300,991	601,982	218,208	2,182,080	69,800,000	284,900	89,865	89,865	218,208	2,193,968	89,865	3,720	218,208	3,720	3,720	3,720
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Cabnet	74,954	74,954	149,908	21,954	10,977,000	179,000	52,555	47,379	47,379	4,911	4,911	4,911	3,720	4,911	3,720	4,911	4,911
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184	35,382	315,710	57,400,000	351,000	55,177	55,177	46,598	46,598	9,479	3,720	46,598	9,479	46,598	46,598
Conor d'Almeida*	344,092	344,092	688,184														



SUMMARY OF ALL OTHER CONTROL WORK, 1918-1943 (INCLUSIVE)

State	Cultivated Black Current Eradication				Nursery Sanitation						
	Number Inspections Made	Number Locations Found	Number Black Currents Destroyed	Number 8-Hour Men-Days	Number of Nurseries		Number Acres Worked			Number Ribes Destroyed	Number 8-Hour Men-Days
					Sanitation Zones Maintained	Sanitation Zones Abandoned	Nurseries Maintaining Zones	Nurseries Which Abandoned Zones	Total Acreage		
Idebo	5,233	2,471	16,553	2,341							
Montana	1,311	798	5,080	514	1		9,391		9,391	1,536,723	7,919
Washington	50,050	5,379	78,256	4,218		1		378	378	59,475	640
Subtotal	56,594	8,647	99,859	7,073	1	1	9,391	378	9,769	1,596,398	8,559
Wyoming					1		2,038		2,038	75,786	569
Total	56,594	8,647	99,859	7,073	2	1	11,429	378	11,807	1,672,184	9,128

State	Mapping Control Areas			Treatment of Infected White Pines				
	Number Acres Mapped (W.P.A. Prot. Jones)	Number 8-Hour Men-Days		Total Number Examined	Number Infected Pines Cut Down	Number Pines Which Centers Removed	Number 8-Hour Men-Days	
Idebo	3,711,465	5,562		1,260,433	48,974	1,016,229	3,210	
Montana	356,175	219		73,076	3,397	67,208	1,189	
Washington	167,141	425		460,720	10,578	391,537	1,261	
Subtotal	4,234,781	6,205		1,794,229	63,439	1,474,974	5,660	
Colorado	206,000	290						
Wyoming	353,700	351						
Subtotal	559,700	641						
Total	4,794,481	7,546		1,794,229	63,439	1,474,974	5,660	

SUMMARY OF ALL EXPENDITURES, 1918-1943 (INCLUSIVE)

State	Federal (All Agencies Including State WPA Projects)	State (Including All Coop. Funds)		Grand Total (State and Federal Funds)	Recapitulation of Regular Funds			
		Indirect Aid	Direct Aid (Ribes Erad.)		E.F.I. & B.E.P.Q.	Forest Service	National Parks	Total
Idebo	\$11,061,102.99	\$226,311.00	\$296,672.53	\$11,584,086.52	\$1,513,628.08	\$3,277,459.60		\$4,791,087.68
Montana	1,091,380.19	111,500.00		1,202,880.19	219,743.87	237,011.64	9,845.96	466,601.27
Washington	1,232,627.29	79,000.00		1,311,627.29	232,584.51	210,067.78	54,392.07	497,044.36
Subtotal	13,385,110.47	416,811.00	296,672.53	14,098,594.00	1,965,956.46	5,744,539.02	24,239.99	7,734,735.27
Colorado	79,230.00	11,700.00		90,930.00		11,852.34		11,852.34
Wyoming	76,705.65	4,700.00		81,405.65	11,314.28			11,314.28
Subtotal	155,935.65	16,400.00		172,335.65	23,166.32			23,166.32
Total	\$13,551,106.12	\$433,211.00	\$296,672.53	\$14,280,989.65	\$1,989,122.76	\$5,744,539.00	\$24,239.99	\$7,759,599.59

Federal W.P.A.				Recapitulation of Emergency Funds							F.W.A.		Grand Total
State	Bureau	Forest Service	Total	State W.P.A. (all Bureau)	C.C.C. and S.C.S.		Total	Bureau	Forest Service	Total			
					Forest Service and State Camps	Dept. Interior							
Idaho	\$7,002,140.71	\$481,135.19	\$7,483,275.90	\$14,160.15	\$92,039.50		\$92,039.50	\$470,841.62	\$1,369,184.16	\$1,840,026.78	\$9,323,302.68		
Montana	125,247.11	136,861.46	262,108.57		15,660.00	4,243.50	20,203.50	89,316.73	149,858.08	239,174.81	501,283.38		
Washington	453,112.47	459,112.47	912,224.94	854.30	37,027.50	12,023.00	50,050.30	105,132.80	134,323.69	239,456.49	1,151,681.43		
Subtotal	3,658,100.69	559,006.65	4,217,107.34	15,014.45	1,044,257.00	23,137.50	1,071,544.50	664,348.01	1,653,366.90	2,317,714.91	7,639,377.29		
Colorado	59,396.11	53,336.11	112,732.22					8,041.45		8,041.45	120,773.67		
Wyoming	59,443.36	54,433.36	113,876.72					7,107.41		7,107.41	120,984.13		
Subtotal	117,640.47	107,769.47	225,409.94					15,148.86		15,148.86	241,556.78		
Total	\$3,775,791.16	\$624,006.65	\$4,399,797.81	\$15,014.45	\$1,044,257.00	\$23,137.50	\$1,071,544.50	\$679,496.87	\$1,653,366.90	\$2,332,863.77	\$7,760,238.03		



## Organization of the Northwestern Regional Office

1. Regional Leader in Charge, H. E. Swanson, Pathologist
2. Assistant Regional Leader, F. O. Walters, Pathologist
3. Cooperative Local Control:
  - a. Clearwater Operation, Idaho:  
Technical Supervisor, H. J. Faulkner, Forester  
Checking Foreman, J. C. Gonyou, Field Aid
  - b. St. Joe Operation, Idaho:  
Technical Supervisor, F. J. Heinrich, Pathologist  
Checking Supervisor, W. F. Painter, Pathologist  
Camp Superintendent, G. W. Schmaltz, Agent  
Checker, R. E. Myers, Agent
  - c. Coeur d'Alene Operation, Idaho:  
Technical Supervisor, M. C. Riley, Forester
  - d. Kaniksu Operation, Idaho-Washington:  
Technical Supervisor, H. A. Brischle, Pathologist  
Unit Supervisor, L. J. Easley, Agent
  - e. Montana Operation:  
Technical Supervisor, A. S. Skoglund, Pathologist
  - f. National Parks:  
Technical Supervisor, M. C. Riley, Forester
4. Projects:
  - a. Control Investigations:  
C. R. Stillinger, Pathologist  
C. M. Chapman, Scientific Aid
  - b. Education and Information:  
H. M. Cowling, Scientific Aid
  - c. Methods Development:  
V. D. Moss\*, Forest Ecologist  
J. F. Breakey\*, Pathologist
5. Business Administration and Clerical:
  - a. E. G. Schmidt, Administrative Assistant  
E. K. LaPrey, Field Assistant  
L. C. Miller, Automobile Mechanic
  - b. M. L. McWold, Clerk  
M. M. McLean, Clerk-Stenographer
  - c. L. E. Klatt, Clerk  
J. R. Pringle, Clerk-Stenographer  
M. Wilson, Clerk-Stenographer  
L. M. Metzger, Clerk-Stenographer  
B. M. Westberg, Clerk-Stenographer
  - d. H. D. Langley, Administrative Assistant - Personnel

\*Personnel assigned to Northwestern Region by H. R. Offord. Work Project:  
BLR-1-6.

## Cooperative Blister Rust Control on State and Private Lands (Work Project BLR-3-4)

### Introduction

Cooperative ribes eradication in 1943 on state and privately owned lands under the provisions of the Lea Act was confined to the state of Idaho where white pine lands in these ownerships constitute 48 per cent of the control area. In Montana and Washington, state and private lands comprise about 28 per cent of the control area which for the most part occurs in small blocks intermingled with federal lands. The state of Idaho and the Clearwater, Potlatch and Priest Lake Timber Protective Associations continued with their financial participation in the program, with the Idaho legislature appropriating \$25,000 for the period April 1, 1943, to June 30, 1945, and the associations contributing on the annual basis of two cents an acre for the entire area in the protective district.

### 1943 Field Program

Field work was performed on each of the three Timber Protective Associations. The entire project consisted of 7 camps and approximately 372 workers. Crews were made up almost entirely of 16 to 17 year old boys recruited by the State Forester and State Land Board in south Idaho and by the Blister Rust Control Office from the Spokane territory. As more fully described in the regional report, the work performed by this type of crew was quite satisfactory under the present handicaps of the war emergency. In view of the urgent need to perform ribes eradication now before further intensification of blister rust on many areas, the continuance of the project with this class of labor during the war period is fully justified.

### Progress

In 1943, the cooperative program worked 10,194 acres of which 935 acres were initial and 9,209 acres reeradication. Including work done by Forest Service crews on state and private lands in Idaho, Washington and Montana the total acreage of this class of ownership worked was 12,446, with 1,675 acres worked initially and 10,771 acres reworked. The progress from 1923 through 1943 on state and private lands is as follows: 821,369 acres first working, 166,702 acres second working, 35,253 acres third working, with 293,346 acres yet to receive initial working.

### Review of Present Status of Control Program

The status of blister rust control on state and private lands is similar to that for the region as a whole in that the major portion of the area supporting white pine stands over 20 years old is either adequately protected or the control work has progressed to the point that another working or mop-up will complete the job. Some losses were sustained where the control program was not sufficiently large in the past to reach all areas before blister rust became heavily entrenched. Control work on state and private lands kept apace with that on federal lands until about 1940 when the emergency relief work projects which had previously accounted for most



of the work on state and private lands reached a low point. The large proportion of older stands in state and private ownership contributed a great deal to the earlier rapid progress because the cost of control and number of workings required in the older stands are less than in the younger stands.

While the mature stands are being cut earlier than was anticipated some years ago in order to meet the heavy demands for war purposes, it is well to point out at this time the value of the control work in such stands. Reference is made to a study in 1936 by the Division of Forest Pathology, Bureau of Plant Industry in merchantable white pine in north Idaho. (Buchanan, T. S. 1938a. Blister Rust Damage to Merchantable Western White Pine. Jour. For. 36: 321-328.) This paper should be reviewed by all who are interested in the problem.

A few important facts in connection with the estimated probable damage to the trees examined near Pierce, Idaho, are presented. First, blister rust infection was not on the pine prior to 1923 and did not become general on all the trees examined until after 1927. Since ribes were eradicated in the fall of 1933, the pines examined were exposed to infection for a period of only 6 years. Second, in this short period of exposure, three of the twelve trees studied had more than 1,000 cankers, the other nine had from 36 to 925 cankers. Third, on the basis of the infection present in 1936 which occurred prior to ribes eradication it was estimated that three of the trees would be seriously damaged by 1941, 1943 and 1950 respectively. In respect to the other 9 trees the estimated years when serious damage would be effected ranged from 1953 to 1972, with three trees not having a canker which would cause damage. Logging was started in this locality in 1941. While these pine were exposed to heavy ribes concentrations not general throughout the mature type, the results of this study are indicative of what might happen to commercial stands without protection from blister rust. It is also important to note that had the rust been allowed to develop unrestricted without removal of ribes, the damage picture would have become progressively worse from year to year. While generally mature timber is subject to damage only over the long period, this time may be materially shortened through a combination of the weakening of trees by blister rust followed by beetle attack. In view of these circumstances, the removal of heavy ribes concentrations was necessary throughout most of the mature stands during the emergency relief work program to prevent serious losses from occurring in commercial stands.

The status of control work in stands less than 20 years old is not favorable. The young stands which had become established prior to 1930, so that initial and second eradication could be performed during the period of large scale control work (1933-1936) are in good condition. The cutover acreage coming back to white pine as a result of logging during the last few years has been much larger than the dwindling facilities for work on state and private lands could cover on ribes eradication. Due to this inadequate program, many of these young stands have received no protection and the rust is building up rapidly. The perpetuation of white pine on these cutover areas in state and private ownership, representing some of the best forest land in the region, is the most serious problem in control of blister rust in the region. Upon the completion of the area classification survey now under way, a more detailed account of the status of the control program will be available.

# Progress Tables

The following tables present the work performed by the Bureau of Entomology and Plant Quarantine under its cooperative, regular, and emergency relief work programs. While this work was primarily directed to state and private lands, the intermingled ownership of forest lands and the changes in ownership necessitate a recapitulation of the acreage worked in order to show the progress according to present ownership.

TABLE 1

## COOPERATIVE RIBES ERADICATION ON STATE AND PRIVATE LANDS IN IDAHO, 1943

Working	Number Acres Worked				Man-Days	Ribes Destroyed	Per Acre	
	State	Private	National Forest	Total			Man-Days	Ribes
Clearwater Timber Protective Association								
Second	392	1,960		2,352	2,848	520,126	1.21	221
Third	168	1,811		1,979	2,078	155,647	1.05	79
Total	560	3,771		4,331	4,926	675,773	1.14	156
Potlatch Timber Protective Association								
First	30	905		935	762	138,580	.77	141
Second	583	1,417	645	2,645	2,731	85,044	1.03	32
Third			45	45	41	495	.91	11
Total	663	2,322	690	3,675	3,534	224,119	.96	61
Priest Lake Timber Protective Association								
Second	690	642		1,332	1,655	103,846	1.24	78
Third	856			856	1,309	58,909	1.53	69
Total	1,546	642		2,188	2,964	162,755	1.35	74
Totals								
First	30	905		935	762	138,580	.77	141
Second	1,665	4,019	645	6,329	7,234	709,016	1.14	112
Third	1,024	1,811	45	2,880	3,428	215,051	1.19	75
Total	2,769	6,735	690	10,194	11,424	1,062,647	1.12	104



TABLE 2

SUMMARY OF COOPERATIVE RIBES ERADICATION ON STATE AND  
PRIVATE LANDS IN IDAHO, 1928-1943

	Acres		Ribes	Per Acre	
Working	Worked	Man-Days	Destroyed	Man-Days	Ribes
Clearwater Timber Protective Association					
First	24,005	16,862	3,769,434	.70	157
Second	7,215	5,945	899,778	.82	125
Third	6,292	6,599	399,712	1.05	64
Total	37,512	29,406	5,068,924	.78	135
Potlatch Timber Protective Association					
First	18,058	14,246	4,002,581	.79	222
Second	11,974	9,263	447,029	.77	37
Third	45	41	495	.91	11
Total	30,077	23,550	4,450,105	.78	148
Priest Lake Timber Protective Association					
First	111,419	31,454	9,021,759	.28	81
Second	8,971	7,336	911,681	.82	102
Third	2,487	2,757	420,615	1.11	169
Total	122,877	41,547	10,354,055	.34	84
Totals					
First	153,482	62,562	16,793,774	.41	109
Second	28,160	22,544	2,258,488	.80	80
Third	8,824	9,397	820,822	1.06	93
Total	190,466	94,503	19,873,084	.50	104

TABLE 3

SUMMARY OF RIBES ERADICATION PERFORMED BY  
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, 1923-1943

Working	Acres	Man-Days	Ribes	Per Acre	
	Worked		Destroyed	Man-Days	Ribes
Idaho					
First	767,232	501,217	125,453,905	.65	164
Second	149,023	142,345	24,772,502	.96	166
Third	22,107	25,101	2,498,648	1.14	113
Total	938,362	668,663	152,725,055	.71	163
Montana					
First	65,469	30,728	5,913,038	.47	90
Second	1,961	2,577	565,047	1.31	238
Third	648	777	59,040	1.20	91
Total	68,078	34,082	6,537,125	.50	96
Washington					
First	48,156	46,892	14,422,701	.97	299
Second	11,920	12,212	2,634,166	1.02	221
Third	4,681	4,036	768,915	.86	164
Total	64,757	63,140	17,825,782	.93	275
Subtotal - Idaho, Montana, Washington					
First	880,857	578,837	145,739,644	.66	166
Second	162,904	157,134	27,971,715	.96	172
Third	27,436	29,914	3,326,603	1.09	121
Total	1,071,197	765,885	177,087,962	.71	165
Colorado and Wyoming					
First	36,619	13,232	1,496,420	.36	41
Second	1,962	664	86,886	.34	44
Total	38,581	13,896	1,583,306	.36	41
Totals - All States					
First	917,476	592,069	147,286,064	.65	161
Second	164,866	157,798	28,058,601	.96	170
Third	27,436	29,914	3,326,603	1.09	121
Total	1,109,778	779,781	178,671,268	.70	161

TABLE 4

PROGRESS OF BLISTER RUST CONTROL ON  
STATE AND PRIVATE LANDS, 1943

State	Working	Number of Acres Worked		
		State	Private	Total
Idaho	First	120	1,299	1,419
	Second	2,013	4,406	6,419
	Third	1,024	3,157	4,181
	Total	3,157	8,862	12,019
Montana	First		256	256
	Second		171	171
	Total		427	427
Total	First	120	1,555	1,675
	Second	2,013	4,577	6,590
	Third	1,024	3,157	4,181
	Total	3,157	9,289	12,446

TABLE 5

PROGRESS OF BLISTER RUST CONTROL ON  
STATE AND PRIVATE LANDS, 1923-1943

State	Working	Number of Acres Worked		
		State	Private	Total
Idaho	First	264,138	490,994	755,132
	Second	50,110	103,007	153,117
	Third	8,892	20,306	29,198
	Total	323,140	614,307	937,447
Montana	First	734	18,993	19,727
	Second	1	2,056	2,057
	Third		1,374	1,374
	Total	735	22,423	23,158
Washington	First	6,832	39,678	46,510
	Second	3,935	7,593	11,528
	Third	2,114	2,567	4,681
	Total	12,881	49,838	62,719
Total	First	271,704	549,665	821,369
	Second	54,046	112,656	166,702
	Third	11,006	24,247	35,253
	Total	336,756	686,568	1,023,324

TABLE 6

EXPENDITURES FOR CALENDAR YEAR, 1943  
WORK PROJECT BLR-3-4, IDAHO

Timber Protective Association	Federal	State and Private	Total
Clearwater	\$ 39,814.54	\$ 4,201.71	\$ 44,016.25
Potlatch	31,445.69	4,013.35	35,464.04
Priest Lake	31,008.76	4,418.75	35,427.51
Total	\$102,268.99	\$12,638.81	\$114,907.80

Note: Total expenditures from state and private funds on blister rust control in Idaho for the period 1928-1943:

State	\$174,705.04
Private	119,967.49
Total	\$294,672.53

## Blister Rust Control Operation on National Forests (Financial Project BLR-4)

### Introduction

Blister rust control work was continued by the Forest Service in 1943, with assistance from the Bureau of Entomology and Plant Quarantine in planning and technical direction, on the Clearwater, St. Joe, Coeur d'Alene, Keniksu and Cabinet National Forests. Available labor did not permit a control project on the Kootenai. The regional program included 37 camps with 1,206 workers. Except for 87 Italian internees, who turned out to be very satisfactory workers, the crews were made up of 16 and 17 year old boys recruited from all parts of the country. These boys did not equal a normal crew and yet in view of the urgent need for ribes eradication work now to prevent serious damage in many stands their employment is fully justified. In a few cases, the work performed was better than in the two previous years. Because of the short season, it was not possible to utilize the full benefit of the training put into these boys. Whereas there were practically no experienced workers returning to the project in 1943, a large number of the boys employed this year will be available in 1944 which will strengthen the crew organization.

Blister rust crews were called upon to fight fire but these demands were not so great as to cause any serious disruption in blister rust work. In two or three instances, the loss of time prevented the completion of ribes eradication on the particular camp areas.

### Progress

In 1943, Forest Service crews worked 25,740 acres of which 7,640 were initial and 18,100 reeradication. The progress to date on National Forest lands is as follows: 1,049,734 acres first working; 227,941 acres second working; 31,131 acres third working. Working has been deferred on 73,922 acres and 269,577 acres are unworked.

### Review of Present Status of Control Program

Upon the completion of the area classification survey initiated in the fall of 1943, it will be possible to present a more informative picture of the present status of the control program. In general, the present status of control on National Forest land is similar to that for the region as a whole including all ownerships. In view of the amount of funds which have been available during the last three years the situation on federal lands could have been much better but the serious labor shortage during this period has caused a definite slow-up in the progress of the work.

Since the inception of control work on National Forest lands, substantial progress has been made in that most of the white pine stands over 20 years old are well protected or are in such a condition that another working or mop-up will complete the job. This does not include the more remote or isolated blocks of white pine which were not reached under the large emergency relief work programs and which became heavily infected with blister rust 8 or 10 years ago. Consideration has been given for some time to drop these areas and this

is being done in the recent area classification survey. As compared to the very favorable protection conditions in stands over 20 years old, the situation in the 0-20 year age class is serious. While the major portion of the control effort has been concentrated in this age class during the last few years, the reduced program in recent years has prevented keeping apace with the necessary work. Generally these young stands require three workings to establish control. The areas on which new white pine has become established in recent years following logging or fires either have received no control work or sufficient time has not elapsed in which to complete the necessary rework. Areas in the upper bracket of this age class (15-20 years) are in good condition if the reworkings have been performed, but there is a considerable acreage on which rework is long overdue.

Thus far the white pine cutover acreage on National Forest lands has not built up to the heavy work load on the blister rust control program as is the case on state and private lands. In connection with stand improvement areas, particularly on the Coeur d'Alene National Forest, where decadent hemlock is removed to permit the reestablishment of white pine following logging, a very difficult problem is arising. Very large numbers of ribes come in following the disturbance of logging and stand improvement on these former white pine-hemlock areas with the result that a high percentage of the white pine seedlings are immediately infected. Standard ribes eradication procedures appear impractical to protect such areas, and careful thought is being given from the standpoint of timber management and blister rust control for the future treatment of this type of condition.

Additional detailed information covering disease surveys, infection conditions, progress of control for the various national forests is presented in the individual operation reports.

#### Progress Tables

The following tables show the work performed by Forest Service crews, together with a report as to the acreage worked in the past under various programs which is now National Forest land.



TABLE 1

## RIBES ERADICATION BY FOREST SERVICE CREWS, 1943

Working	Number Acres Worked					Man-Days	Ribes Destroyed	Per Acres	
	National Forest	Public Domain	State	Private	Total			Man-Days	Ribes
Clearwater National Forest									
First	1,295				1,295	3,949	646,943	3.05	500
Second	376				376	993	54,651	2.64	165
Total	1,671				1,671	4,942	701,594	2.96	420
St. Joe National Forest									
Second	1,101	270		252	1,623	1,625	55,078	1.00	34
Third	2,622	837		1,202	4,661	7,571	282,151	1.62	61
Total	3,723	1,107		1,454	6,284	9,196	337,229	1.46	54
Coeur d'Alene National Forest									
First	1,220				1,220	2,456	120,719	2.01	104
Second	1,612				1,612	2,029	96,294	1.26	61
Third	736				736	1,467	69,197	1.99	94
Total	3,568				3,568	5,952	286,210	1.67	82
Kaniksu National Forest									
First	1,738	160	40	394	2,332	2,545	327,136	1.07	137
Second	6,171		348	135	6,654	5,547	394,334	.83	59
Third	1,203			144	1,347	1,432	144,228	1.06	107
Total	9,162	160	388	673	10,383	9,524	865,798	.92	83
Cabinet National Forest									
First	2,487			256	2,743	2,359	296,869	.86	108
Second	531			171	702	1,223	37,794	1.74	54
Third	389				389	137	4,704	.35	12
Total	3,407			427	3,834	3,719	339,367	.97	89
Totals - All Forests									
First	6,790	160	40	650	7,640	11,309	1,597,717	1.43	133
Second	9,791	270	348	558	10,967	11,417	640,201	1.04	58
Third	4,950	837		1,346	7,133	10,607	500,230	1.49	70
Total	21,531	1,267	388	2,554	25,740	33,333	2,538,198	1.29	99

TABLE 2

RIBES ERADICATION BY FOREST SERVICE CREWS, 1930-1943

National forest	Working	Acres		Ribes Destroyed	Per Acre	
		Worked	Man-Days		Man-Days	Ribes
Clearwater	First	137,839	161,440	47,895,978	.86	255
	Second	46,619	47,327	6,519,213	1.02	140
	Third	3,214	3,237	351,287	1.01	109
	Total	237,722	212,004	54,766,478	.89	230
St. Joe	First	261,060	272,153	82,014,341	1.04	314
	Second	86,558	104,222	10,239,631	1.20	118
	Third	19,755	30,204	2,012,427	1.55	102
	Total	367,373	406,579	94,266,399	1.11	257
Coeur d'Alene	First	269,436	305,995	48,651,249	1.13	181
	Second	50,410	67,521	7,759,901	1.34	154
	Third	10,572	14,076	1,139,844	1.33	108
	Total	330,418	385,592	57,550,994	1.17	174
Keniksu	First	225,895	140,233	30,501,075	.62	135
	Second	46,012	34,538	4,443,499	.75	97
	Third	3,476	2,238	268,902	.64	77
	Total	275,333	177,009	35,213,476	.64	128
Cabinet	First	43,184	45,602	9,076,781	1.06	210
	Second	6,769	9,107	766,531	1.35	113
	Third	2,970	2,935	160,555	.99	54
	Total	52,923	57,644	10,003,867	1.09	189
Kootenai	First	19,829	13,259	1,662,331	.67	84
	Second	1,271	1,424	118,031	1.12	93
	Total	21,100	14,683	1,780,362	.70	84
Totals All Forests	First	1,007,293	936,632	219,801,755	.93	218
	Second	237,639	264,139	29,846,806	1.11	126
	Third	39,987	52,690	3,933,015	1.32	98
	Total	1,284,919	1,253,511	253,581,576	.98	197



TABLE 3

PROGRESS OF BLISTER RUST CONTROL ON  
NATIONAL FOREST LANDS, 1943

National Forest	Number of Acres Worked			
	First	Second	Third	Total
Clearwater	1,295	376		1,671
St. Joe		1,746	2,667	4,413
Coeur d'Alene	1,220	1,612	736	3,568
Kaniksu	1,788	6,171	1,203	9,162
Cabinet	2,487	531	389	3,407
Total	6,790	10,436	4,995	22,221

TABLE 4

PROGRESS OF BLISTER RUST CONTROL ON NATIONAL FOREST LANDS, 1923-1943  
(Present Ownership)

National Forest	Number of Acres Worked				Acres Unworked	Acres Deferred	Acres in Control Area
	First	Second	Third	Total			
Clearwater	151,097	49,459	3,780	204,336	44,773	8,860	204,730
St. Joe	216,208	76,461	12,401	305,070	84,783	11,089	312,080
Coeur d'Alene	315,710	46,698	9,479	371,887	32,382	10,303	359,395
Kaniksu	258,054	47,379	3,227	308,660	69,939	26,202	354,195
Cabinet	61,934	6,779	2,244	70,957	12,020	3,034	76,988
Kootenai	46,781	1,165		47,946	25,680	14,434	86,895
Total	1,049,784	227,941	31,131	1,308,856	269,577	73,922	1,393,283

Note: 36,619 acres first working; 1,962 acres second working; National Forest lands in Colorado and Wyoming

Expenditures by the Forest Service for Blister Rust Control

Calendar Year 1943

Clearwater	\$ 71,902.85
St. Joe	131,450.50
Coeur d'Alene	87,127.25
Keniksu	102,803.34
Cabinet	<u>42,200.99</u>
Total	\$435,483.93

Total Expenditures, 1930-1943

<u>Forest</u>	<u>Regular</u>	<u>ERA(WPA)</u>	<u>NIRA(PWA)</u>	<u>Total</u>
Clearwater	\$ 759,169.19	\$ 78,808.87	\$ 334,645.93	\$1,172,623.99
St. Joe	1,530,396.19	6,983.40	376,356.66	1,913,736.25
Coeur d'Alene	674,189.50	197,410.60	472,399.21	1,343,999.31
Keniksu	523,772.48	137,952.32	320,103.04	981,827.84
Cabinet	217,935.50	108,618.46	149,858.06	476,412.02
Kootenai	<u>39,076.14</u>	<u>28,233.00</u>		<u>67,309.14</u>
Total	\$3,744,539.00	\$58,006.65	\$1,653,362.90	\$5,955,908.55

Blister Rust Control on National Parks  
(Financial Project BLR-5)

Introduction

The blister rust control program was continued on Mount Rainier and Glacier during 1943. Progress was seriously curtailed as a result of the labor situation, necessitating the employment of 16 and 17 year old boys and the use of Civilian Public Service workers. Bad weather conditions causing an abnormally short working season also handicapped progress. In view of the amount of blister rust infection present in Mount Rainier and the urgent need for getting protection established as soon as possible, the employment of these boys is justified. While they do not equal a normal crew in performance, their work is acceptable under present emergencies. Accomplishments by the Civilian Public Service crew assigned to blister rust work on Glacier were disappointing and it would appear that no substantial progress can be expected with this type of labor.

Consideration was given to starting control work on Yellowstone in 1943 but because of the shortage of labor and also the lack of experienced blister rust supervisors to assign to a new project, it was decided to postpone the initiation of a control project on this park until after the war. For several years, efforts had been made to get a project under way in order to complete the protection of the pine before blister rust becomes established, so it is not without some sacrifice and the possibility of a more difficult job later on that the work is being postponed at this time.

Review of the Present Status of Control

Mount Rainier. Initial working was completed on 8,254 acres by 1938. No extensions of this work are contemplated because the rework program started prior to 1938 and carried on each year since was not adequate to keep ahead of the spread and intensification of the rust which was already present. Consequently, it was necessary to abandon the Stevens-Cowlitz block because of the great amount of damaging infection. The values which can yet be protected on this area do not justify the cost of completing the job of ribes eradication. The initial work by CCC labor made a great reduction in the ribes population over this area which caused a correspondingly great reduction in the volume of blister rust cankers forming each year. This will only serve to delay for an indeterminable period the elimination of pine from the area and it is possible that in some parts of the stand where the ribes were thoroughly eradicated on initial working, the white pine may continue to survive for a long time.

The difficult problem of protecting white pine areas in Mount Rainier, as demonstrated by observation and experience and further substantiated by recent findings in the research program, makes this retrenchment advisable. The frequency and long duration of heavy fogs or clouds enveloping the white pine stands accompanied by temperatures and air currents favorable to rust development and spread are characteristic of the high elevations in the park. Long distance spread from highly susceptible ribes to Pinus albicaulis is another factor contributing to the control problem. Unlike the protection of

white pine grown for commercial purposes which stands generally are not surrounded by conditions so favorable to blister rust and where control is designed to bring the pine stand through its normal rotation for harvesting, protection of the pine stands in the parks must be complete and permanent, for these trees are not to be cut when they reach merchantable size. Consequently, where a certain amount of new infection in a commercial white pine stand would cause no damage, this situation could not be allowed to continue indefinitely for white pine which is to remain for its natural life as in the National Parks.

In view of these circumstances, the control effort since 1941 has been focused on the Longmire, Silver Forest and White River blocks and the future control plans will be concerned with these areas only. Even though blister rust infection was already present on these areas when control work was started, ribes eradication was performed sufficiently early to retard any appreciable build-up of infection and subsequent rework has left the areas in good condition. For reasons already mentioned, maintenance work, particularly in stream type, and periodic coverage of troublesome portions of the areas for the purpose of eliminating cankers will be necessary.

Glacier. The conditions on white pine areas considered for protection from blister rust in Glacier are not as favorable for rust development as in the case of Mount Rainier. The absence of Ribes bracteosum and R. petiolare reduces the possibility of any abnormally long distances of spread from ribes to pine and in most cases a normal protection zone should suffice. While blister rust was present on ribes and pine when control work was started in 1939, no new pine infection has been found on the worked areas. The initial advantage gained in starting ribes eradication before blister rust became well established is being lost as a result of the size and nature of the control program of the last two years. The ribes eradication program should be pushed to completion within the shortest time possible to avoid high maintenance costs in the future.

#### Summary

The following tables present a brief summary of the progress of blister rust control on National Parks.

TABLE 1

## RIBES ERADICATION ON NATIONAL PARKS, 1943

National Park	Working	Acres Worked	Man- Days	Ribes Destroyed	Per Acre	
					Man- Days	Ribes
Mount Rainier	Third	425	1,370	51,033	3.22	120
Glacier	First	302	771	103,559	2.55	343
	Second	86	200	35,086	2.33	408
	Total	388	971	138,645	2.50	357
Grand Total		813	2,341	189,683	2.83	273

TABLE 2

## RIBES ERADICATION ON NATIONAL PARKS, 1930-1943

National Park	Working	Acres Worked	Man- Days	Ribes Destroyed	Per Acre	
					Man- Days	Ribes
Mount Rainier	First	8,254	10,070	1,640,507	1.22	199
	Second	5,023	5,941	400,913	1.18	80
	Third	4,369	4,279	145,262	.93	33
	Total	17,651	20,290	2,186,682	1.15	124
Glacier	First	3,197	3,905	464,555	1.22	145
	Second	817	963	157,692	1.18	193
	Total	4,014	4,868	622,247	1.21	155
Totals	First	11,451	13,975	2,105,062	1.22	184
	Second	5,845	6,904	558,605	1.18	96
	Third	4,369	4,279	145,262	.93	33
	Total	21,665	25,158	2,808,929	1.16	130

TABLE 3

## PROGRESS OF CONTROL ON NATIONAL PARKS

National Park	Acres in Control Area	Acres Worked				Acres Unworked Initially
		First	Second	Third	Total	
Mount Rainier	8,254	8,254	5,028	4,369	17,651	
Glacier	10,000	3,197	817		4,014	6,803
Yellowstone	12,900					12,900
Grand Teton	5,800					5,800
Rocky Mountain	7,000					7,000
Total	43,954	11,451	5,845	4,369	21,665	32,503

Statement of funds expended by National Park Service for blister rust control work:

<u>National Park</u>	<u>1943 Calendar Year</u>	<u>All Years</u>
Mount Rainier	\$14,937.34	\$54,392.07
Glacier	<u>1,090.34</u>	<u>9,845.76</u>
Total	\$16,027.68	\$64,237.83

Note: Above expenditures represent regular funds.  
No emergency funds were expended and the  
cost of CCC work is not included.

## BLISTER RUST CONTROL, INLAND EMPIRE, 1943

By

Frank O. Walters

Assistant Regional Leader

A summary of the progress of blister rust control in the Inland Empire is given below by combining the following operations.

1. Clearwater operation
2. St. Joe operation
3. Coeur d'Alene operation
4. Kaniksu operation
5. Montana operation (Kootenai and Cabinet forests)
6. Mount Spokane operation (no work since 1941)

The commercially important white pine areas of the Northwestern Region are located in northern Idaho, eastern Washington and western Montana and are considered as a unit known as the Inland Empire.

To secure workers it was necessary to recruit 16 and 17 year old boys. The boys for the Forest Service camps came from the East and Middle West as well as the West. The workers used in the Bureau camps were secured largely from south Idaho and the Spokane area. To replace the experienced overhead lost to the armed forces and industry, several high school instructors without previous eradication experience were hired, given preseason training and placed in charge of camps.

This year wages were paid on a monthly basis. In the past, due to early season rains, loss of wages has resulted while board charges continued. This was the cause of considerable dissatisfaction on the part of the workers and increased the labor turnover. During rainy periods it has been possible to work at canker elimination, wood cutting, construction of work trails and maintenance of trails.

This season most of the areas on which work was performed involved second or third workings, and more efficient work is required to put the ground in the desired shape than is the case in initial eradication. The fact should be appreciated that these boys were assigned to do the work formerly done by fully-matured individuals. Instability is a mark of this age group, and the labor turnover was large, yet by close supervision and through the use of a well-rounded training program the per man-day output was held up to 88 per cent of that of last season while the efficiency remained practically the same. It is significant that by continuing the program almost 36,000 acres of white pine lands were given much needed protection. This means the preservation of a vital resource that in a few years will help to offset the terrific drain now being made by the demands of war.

This year the Bureau of Entomology and Plant Quarantine carried on control work on state and private lands with a total of 7 camps and 372 men, while the Forest Service operating largely on federal lands had 37 camps and 1,206 men. Twenty-three per cent less acreage was covered and fourteen per cent fewer man-days were expended during the current season than last year.



This year fire was not a major factor in interfering with work. The St. Joe Forest Service camps spent four days fighting fire on the Nezperce Forest and the Cabinet crews were on the Wyoming fire for twelve days. We are now entering the very critical phase of the control job. The more perplexing problems occur in the younger age classes. Most of the advance reproduction, pole and mature stands can be given what additional protection is necessary at a reasonable cost. It has been possible to perform rework on only a small part of the large acreages of younger age classes covered under the expanded program carried on during the emergency period from 1933 to 1936. Since 1941 the man power shortage has been so acute that the progress has been further curtailed, and as a net result there has accumulated a far greater acreage in need of immediate working than the size of recent programs can possibly keep pace with. In addition, the accelerated timber cutting of recent years has greatly added to the ever-mounting area of cutover land in need of attention.

Certain cutover and stand improvement areas have created complex problems. Profuse and prolonged germination of ribes and dense vegetative cover on these areas make effective control measures difficult and costly. Studies as to suitable methods for handling such areas are under way.

The very favorable year for the spread of rust experienced during the summer and fall of 1941 indicates the severity of the disease where the ribes remaining per acre exceed the allowable standards. The distance of spread under certain geographical and meteorological conditions was greater than had been anticipated, and such situations must be given special consideration in planning control measures.

It is obvious that under existing conditions certain measures of retrenchment are necessary. During the fall the blister rust staff and certain Forest Service personnel helped to classify the lands within the control boundaries. Standards were set up to indicate feasibility of control, the potential timber-producing capacity of the land, present status of the stand in regard to presence of ribes, rust and probable damage to the stand. Thus, the component parts of the control area were catalogued. The most productive young stands were selected as areas of high priority. Areas which could be temporarily deferred from working were so classified. Stands which could not be afforded protection at a reasonable cost, which were too badly infected or lacked the desired white pine producing capacity were dropped from future consideration. With the proper classifications setup it will be possible to better establish working priorities and plan long range control programs on the lands most suitable for white pine production.

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:



TABLE 1

## EXPENDITURES BY APPROPRIATIONS IN INLAND EMPIRE, 1943

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 32,936.11
	Regular BLR-3-4	102,268.99
	Subtotal	\$135,205.10
State of Idaho Timber Protective Associations	State BLR-3-4	12,252.13
	Private BLR-3-4	386.63
	Subtotal	\$ 12,638.81
Forest Service	Regular BLR-4	\$435,489.93
Total		\$583,333.84

TABLE 2

## CLASSIFIED EXPENDITURES IN INLAND EMPIRE, 1943

Item	Bureau of Entomology and Plant Quarantine			Total	Forest Service	
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4		Regular BLR-4	Total
Sal. perm. men	\$27,750.96			\$ 27,750.96	\$ 28,649.43	\$ 56,400.39
Sal. temp. men	1,499.67	\$ 18,597.08	\$ 1,975.67	22,072.42	33,216.93	55,289.35
Wages, temp. labs		66,335.85	8,993.83	75,329.73	277,256.23	352,585.96
Subs. sup.	140.20	14,917.57	1,669.26	16,727.03	68,219.48	84,946.51
Equipment	141.21	52.50		193.71	14,582.92	14,776.63
Travel & trans.	1,413.48	1,070.02		2,483.50	7,842.41	10,325.91
Chemicals						
Twine					172.80	172.80
Other sup.	1,990.59	1,295.97		3,286.56	5,549.73	8,836.29
Total	\$32,936.11	\$102,268.99	\$12,638.81	\$147,843.91	\$435,489.93	\$583,333.84

	Bureau	Forest Service
Pounds of twine used	2,361	5,242
Pounds of chemical used	3,056	14,720



SUMMARY OF RIBES ERADICATION, 1943  
INLAND EMPIRE

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Men-Days	Total Ribes	Total Gallons Spray
Cutover (1940-1943)	552	1,416		1,968	2,811	833,928	
Cutover (Prior 1940)	985	4,993	2,284	8,262	8,242	622,870	
Burn (Prior 1940)		90	184	274	296	23,161	
Reproduction	5,006	7,871	4,539	17,416	23,559	1,646,450	
Pole	677	1,828	2,102	4,607	3,358	84,691	
Mature	158	369	74	601	351	9,537	
Brush	789	77	13	879	108	14,243	
All Upland	8,167	16,644	9,196	34,007	38,725	3,234,880	
Stream (Hand)	458	652	817	1,927	5,150	326,716	
Stream (Chemical)	208	60	325	593	882	39,249	13,483
All Stream	458	652	817	1,927	6,032	365,965	
All Types	8,625	17,296	10,013	35,934	44,757	3,600,845	

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Men-Days	Total Ribes	Gallons Spray	Per Acre Basis Man-Days Ribes	Gallons Spray
Cutover (1940-1943)	552	1,018	437,240		1.84	792
Cutover (Prior 1940)	985	762	138,580		.77	141
Reproduction	5,006	7,656	750,999		1.53	150
Pole	677	128	3,557		.19	5
Mature	158	40	1,568		.25	10
Brush	789	31	590		.04	1
All Upland	8,167	9,635	1,332,534		1.18	163
Stream (Hand)	458	2,027	185,085		4.43	404
Stream (Chemical)	208	409	18,678	6,226	1.97	90
All Stream	458	2,436	203,763		5.32	445
All Types	8,625	12,071	1,536,297		1.40	178

TABLE 3B - SECOND WORKING

Cutover (1940-1943)	1,416	1,793	396,688		1.27	280
Cutover (Prior 1940)	4,993	4,975	304,785		1.00	61
Burn (Prior 1940)	90	29	3,313		.32	37
Reproduction	7,871	8,471	537,155		1.08	68
Pole	1,828	1,893	39,497		1.04	22
Mature	369	224	7,271		.61	20
Brush	77	66	12,229		.96	159
All Upland	16,644	17,451	1,300,938		1.05	78
Stream (Hand)	652	1,154	45,579		1.77	70
Stream (Chemical)	60	46	2,700	900	.77	45
All Stream	652	1,200	48,279		1.84	74
All Types	17,296	18,651	1,349,217		1.08	78

TABLE 3C - THIRD WORKING

Cutover (Prior 1940)	2,284	2,505	179,505		1.10	79
Burn (Prior 1940)	184	267	19,848		1.45	108
Reproduction	4,539	7,432	358,296		1.64	79
Pole	2,102	1,337	41,637		.64	20
Mature	74	87	698		1.18	9
Brush	13	11	1,424		.85	110
All Upland	9,196	11,639	601,408		1.27	65
Stream (Hand)	817	1,969	96,052		2.41	118
Stream (Chemical)	325	427	17,871	6,357	1.31	55
All Stream	817	2,396	113,923		2.33	139
All Types	10,013	14,035	715,331		1.40	71



TABLE 4  
SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1943  
INLAND EMPIRE

State	Working	Class	Acres	Effective Man-Days	Ribes	Gallons Spray	Per Acre Basis Man-Days	Ribes
Idaho	First	Eq-Coop.	985	762	138,580		.77	141
		FS-Reg.	4,622	8,411	936,632	6,226	1.82	202
		Total	5,614	9,173	1,075,212	6,226	1.63	192
	Second	Eq-Coop.	6,329	7,234	709,016		1.14	112
		FS-Reg.	7,642	9,362	404,673	900	1.09	53
		Total	13,971	16,596	1,113,689	900	1.12	80
	Third	Eq-Coop.	2,880	3,428	215,051	2,445	1.19	75
		FS-Reg.	5,625	9,362	369,141	3,912	1.66	56
		Total	8,505	12,790	584,192	6,357	1.50	69
	All Workings	Eq-Coop.	10,194	11,424	1,062,647	2,445	1.12	104
Washington		FS-Reg.	17,895	26,125	1,710,445	11,039	1.46	96
	First	FS-Reg.	28,090	37,549	2,775,093	13,483	1.34	79
	Second	FS-Reg.	268	539	164,215		2.01	613
	Third	FS-Reg.	2,623	1,832	197,734		.70	75
Montana		FS-Reg.	1,119	1,118	126,435		1.00	113
	All Workings	FS-Reg.	4,010	3,469	488,385		.87	122
	First	FS-Reg.	2,743	2,359	296,869		.86	108
	Second	FS-Reg.	702	1,223	37,794		1.74	54
Total		FS-Reg.	389	197	4,704		.85	12
	All Workings	FS-Reg.	3,834	3,719	339,367		.77	89
	First	Eq-Coop.	985	762	138,580		.77	141
		FS-Reg.	7,640	11,309	1,397,717	6,226	1.48	163
Total	First	Total	8,625	12,071	1,536,297	6,226	1.40	178
		Eq-Coop.	6,329	7,234	709,016		1.14	112
		FS-Reg.	10,367	11,417	640,201	900	1.04	58
	Second	Total	17,295	18,651	1,349,217	900	1.08	78
		Eq-Coop.	2,880	3,428	215,051	2,445	1.19	75
		FS-Reg.	7,133	10,607	500,280	3,912	1.49	70
	Third	Total	10,013	14,035	715,331	6,357	1.40	71
		Eq-Coop.	10,194	11,424	1,062,647	2,445	1.12	104
		FS-Reg.	26,740	33,333	2,538,198	11,039	1.29	99
	All Workings	Total	35,934	44,757	3,600,845	13,483	1.25	100

TABLE 5  
OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943  
INLAND EMPIRE

State	Working	Number of Acres Worked												
		By Forest Service					By Bureau of Entomology and Plant Quarantine					Total		
		National Forest	Public Domain	State	Private	Total	National Forest	State	Private	Total	National Forest	Public Domain	Total	Other
														Total
Idaho	First	4,035	160	40	394	4,629		80	905	985	4,035	160	4,195	120
	Second	6,637	270	348	387	7,642	645	1,665	4,019	6,329	7,282	270	7,552	2,013
	Third	3,442	837		1,346	5,625	45	1,024	1,811	2,880	3,487	837	4,324	3,157
	Total	14,114	1,267	388	2,127	17,895	690	2,769	6,735	10,194	14,804	1,267	16,071	8,662
	First	268				268								268
Washington	Second	2,623				2,623					2,623			2,623
	Third	1,119				1,119					1,119			1,119
	Total	4,010				4,010					4,010			4,010
	First	2,487			255	2,743					2,487		255	2,743
	Second	531			171	702					531		171	702
Montana	Third	389			389	389					389			389
	Total	3,407			427	3,834					3,407		427	3,834
	First	6,790	160	40	650	7,640	80	905	985	6,790	160	6,950	120	1,675
	Second	9,791	270	348	858	10,967	645	1,665	4,019	6,329	10,436	270	10,706	2,013
	Third	4,950	837		1,346	7,133	45	1,024	1,811	2,880	4,995	837	5,832	3,157
Total	Total	21,531	1,267	388	2,554	25,740	690	2,769	6,735	10,194	22,321	1,267	23,588	8,829
														16,446



TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1943  
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes by Species				Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	
First	Cutover (1940-1943)	552	24,123	413,117			437,240
	Cutover (Prior 1940)	985	89,774	48,680	126		138,580
	Reproduction	5,006	450,688	296,697		3,614	750,999
	Pole	677	959	2,598			3,557
	Mature	158	1,178	292		98	1,568
	Brush	789	210	380			590
	All Upland	8,167	566,932	761,764	126	3,712	1,332,534
	Stream	458	166,922	517	18,678	17,646	203,763
Second	All Types	8,625	733,854	762,281	18,804	21,358	1,536,297
	Cutover (1940-1943)	1,416	37,258	347,798	11,632		396,688
	Cutover (Prior 1940)	4,993	108,746	190,370	2,048	3,621	304,785
	Burn (Prior 1940)	90	459	2,854			3,313
	Reproduction	7,871	255,711	275,014		6,430	537,155
	Pole	1,828	10,678	28,819			39,497
	Mature	369	6,624	647			7,271
	Brush	77	582	11,647			12,229
Third	All Upland	16,644	420,058	857,149	13,680	10,051	1,300,938
	Stream	652	42,988	2,035	2,700	556	48,279
	All Types	17,296	463,046	859,184	16,380	10,607	1,349,217
	Cutover (Prior 1940)	2,284	73,962	98,633	6,910		179,505
	Burn (Prior 1940)	184	18,806	1,042			19,848
	Reproduction	4,539	125,799	232,435	62		358,296
	Pole	2,102	37,733	3,829		75	41,637
	Mature	74	493	205			698
All Workings	Brush	13	129	1,295			1,424
	All Upland	9,196	256,922	337,439	6,972	75	601,408
	Stream	817	82,178	580	22,068	9,097	113,923
	All Types	10,013	339,100	338,019	29,040	9,172	715,331
	Cutover (1940-1943)	1,968	61,381	760,915	11,632		833,928
	Cutover (Prior 1940)	8,262	272,482	337,683	9,084	3,621	622,870
	Burn (Prior 1940)	274	19,265	3,896			23,161
	Reproduction	17,416	832,198	804,146	62	10,044	1,646,450
All Workings	Pole	4,607	49,370	35,246		75	84,691
	Mature	601	8,295	1,144		98	9,537
	Brush	879	921	13,322			14,243
	All Upland	34,007	1,243,912	1,956,352	20,778	13,838	3,234,880
	Stream	1,927	292,088	3,132	43,446	27,299	365,965
	All Types	35,934	1,536,000	1,959,484	64,224	41,137	3,600,845





SUMMARY OF RIBS ERADICATION, 1923-1933  
INLAND EMPIRE

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Men-Days	Total Ribs	Gallons Spray
Cutover (1940-1943)	552	1,627	54	2,233	3,000	847,930	
Burn (1940-1943)		60		60	232	134,749	
Cutover (Prior 1940)	50,524	53,641	15,736	119,901	129,728	34,158,710	
Burn (Prior 1940)	8,181	1,703	184	10,068	11,066	3,855,990	
Reproduction	594,598	15,779	27,409	787,786	897,350	304,409,902	
Pole	356,741	78,204	7,455	442,400	201,978	35,554,030	
Mature	722,555	44,430	2,332	769,317	337,966	70,373,177	
Brush	25,830	2,431	472	28,733	27,188	5,120,191	
Subalpine	3,255	291	88	3,634	2,363	491,592	
Meadow-Field	2,569	10		2,579	152	12,203	
All Upland	1,764,805	348,176	53,730	2,166,711	1,610,923	352,678,524	
Stream (Hend)	119,245	47,736	13,553	180,534	301,692	69,658,030	
Stream (Chemical)	23,124	9,298	1,574	33,996	69,539	5,475,332	1,794,639
Stream (Mechanical)	3,728	155	40	3,923	32,288	2,251,390	
Stream (Zone)	372	4,476		4,848	4,354	625,352	
All Stream	123,345	52,367	13,593	189,305	408,474	77,991,014	
All Types	1,888,150	400,543	67,423	2,356,116	2,019,395	430,569,538	

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Men-Days	Total Ribs	Gallons Spray	Per Acre Basis Men-Days	Ribs	Gallons Spray
Cutover (1940-1943)	552	1,018	437,240		1.84	792	
Cutover (Prior 1940)	50,524	49,331	16,954,236		.98	336	
Burn (Prior 1940)	8,181	7,156	2,894,183		.87	354	
Reproduction	594,598	653,862	180,806,528		1.12	304	
Pole	356,741	151,436	27,833,255		.42	78	
Mature	722,555	307,814	87,219,075		.43	93	
Brush	25,830	24,546	4,857,422		.95	188	
Subalpine	3,255	2,170	463,787		.67	142	
Meadow-Field	2,569	151	12,131		.06	5	
All Upland	1,764,805	1,207,534	301,477,857		.68	171	
Stream (Hend)	119,245	221,483	57,166,754		1.36	479	
Stream (Chemical)	23,124	54,795	4,657,968	1,521,721	2.37	201	66
Stream (Mechanical)	3,728	30,392	2,147,593		8.15	576	
Stream (Zone)	372	1,315	141,227		3.53	890	
All Stream	123,345	307,936	64,113,542		2.50	550	
All Types	1,888,150	1,515,519	365,591,339		.80	194	

TABLE 7B - SECOND WORKING

Cutover (1940-1943)	1,627	1,940	402,879		1.19	248	
Burn (1940-1943)	60	232	134,749		3.87	2,246	
Cutover (Prior 1940)	53,641	61,243	15,413,877		1.14	287	
Burn (Prior 1940)	1,703	3,643	951,949		2.14	559	
Reproduction	155,779	195,590	21,062,559		1.19	127	
Pole	78,204	45,581	4,399,816		.58	56	
Mature	44,430	28,533	3,549,564		.64	80	
Brush	2,431	2,292	240,671		.94	99	
Subalpine	291	154	22,457		.53	77	
Meadow-Field	10	1	72		.10	7	
All Upland	348,176	340,809	45,178,593		.98	133	
Stream (Hend)	47,736	62,919	10,362,807		1.32	217	
Stream (Chemical)	9,298	13,252	728,192	242,794	1.43	75	14
Stream (Mechanical)	155	1,254	63,794		8.09	415	
Stream (Zone)	4,476	3,639	495,035		.81	108	
All Stream	52,367	81,064	11,639,828		1.55	222	
All Types	400,543	421,273	57,815,521		1.05	144	

TABLE 7C - THIRD WORKING

Cutover (1940-1943)	54	42	7,311		.78	145	
Cutover (Prior 1940)	15,736	19,154	1,800,597		1.22	114	
Burn (Prior 1940)	184	257	19,848		1.45	108	
Reproduction	27,409	36,798	2,540,715		1.34	93	
Pole	7,455	4,961	421,019		.87	56	
Mature	2,332	1,619	204,538		.89	88	
Brush	472	300	22,098		.64	47	
Subalpine	88	39	5,348		.44	61	
All Upland	53,730	63,180	5,021,974		1.18	93	
Stream (Hend)	13,553	17,890	2,128,492		1.27	156	
Stream (Chemical)	1,574	1,492	89,172	30,124	.95	57	19
Stream (Mechanical)	40	542	20,000		16.05	500	
All Stream	13,693	19,424	2,237,644		1.42	163	
All Types	67,423	82,604	7,259,618		1.23	108	



TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1943  
INLAND EMPIRE

State	Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis Man-Days Ribes
Idaho	First	Ex-Reg.	48,994	20,468	5,042,300	79,854	.42 103
		Ex-Coop.	153,482	62,562	16,793,774	175,584	.41 109
		Ex-Emerg.	397,953	290,528	77,495,446	152,499	.73 195
		FS-Reg.	220,590	221,461	59,022,155	392,031	1.00 268
		FS-Emerg.	331,703	134,845	54,142,291	113,170	.64 178
	Second	CCC	517,105	540,911	109,365,841	550,758	1.05 211
		Total	1,643,130	1,330,776	321,862,907	1,463,896	.91 196
		Ex-Coop.	28,160	22,544	2,259,488	11,078	.80 80
		Ex-Reg.	104,562	99,803	17,869,385	56,311	.94 171
		FS-Reg.	135,540	136,350	16,279,371	52,671	1.00 141
Washington	First	Ex-Reg.	48,994	20,468	5,042,300	79,854	.42 103
		Ex-Coop.	190,466	94,503	19,873,084	189,107	.50 104
		Ex-Reg.	514,942	404,100	96,874,569	213,935	.79 188
		FS-Reg.	330,415	391,479	77,334,386	456,423	1.03 213
		FS-Emerg.	337,969	216,240	55,635,775	125,491	.64 168
	Second	CCC	590,414	661,693	123,729,240	667,303	1.12 210
		Total	2,063,020	1,798,483	379,640,354	1,722,123	.89 184
		Ex-Emerg.	48,156	45,892	14,422,701	37	.29 299
		FS-Reg.	14,219	14,129	5,540,541	39	.39 100
		FS-Emerg.	34,417	12,708	3,858,496	37	.112
Montana	First	CCC	19,741	21,426	3,254,404	1,039	.165
		Total	116,533	92,115	27,076,442	.82	.232
		Ex-Emerg.	11,920	12,212	2,534,156	1.05	.221
		FS-Reg.	11,503	6,810	1,589,014	.69	.138
		FS-Emerg.	1,949	1,878	154,764	.86	.79
	Second	CCC	2,597	3,279	232,829	1,279	.90
		Total	27,229	23,797	4,610,773	.94	.165
		Ex-Emerg.	4,651	4,036	769,915	.86	.164
		FS-Reg.	1,752	1,334	201,700	.76	.115
		Total	5,433	5,370	970,615	.83	.151
Idaho Washington Montana	First	Ex-Emerg.	64,727	63,140	17,825,782	.98	.275
		FS-Reg.	27,474	22,773	7,331,556	.81	.267
		FS-Emerg.	36,366	14,365	4,013,260	.40	.110
		CCC	22,328	24,705	3,487,235	1.11	.156
		Total	150,925	124,504	32,667,830	.82	.216
	Second	Ex-Reg.	1,383	2,315	452,300	30,665	1.07 324
		Ex-Emerg.	64,086	28,413	5,450,738	1,330	.44 85
		FS-Reg.	15,779	15,690	2,284,611	2,452	.99 145
		FS-Emerg.	33,458	33,088	7,157,633	20,598	.99 214
		CCC	13,772	10,053	1,226,868	2,790	.75 94
Idaho Washington Montana	First	Total	129,482	89,489	15,625,150	37,452	.70 122
		Ex-Reg.	619	980	299,410	4,130	1.58 484
		Ex-Emerg.	1,342	1,597	265,637		1.19 198
		FS-Reg.	5,265	5,593	517,114	5,976	1.12 98
		FS-Emerg.	2,100	2,454	204,021	1,043	1.17 97
	Second	CCC	879	2,174	163,427	3,221	.241
		Total	10,001	13,108	1,449,609	11,146	1.31 145
		Ex-Emerg.	648	777	59,040	1,220	.91
		FS-Reg.	2,795	2,684	142,772	.96	.51
		FS-Emerg.	150	68	6,059	.45	.40
Idaho Washington Montana	First	CCC	25	183	11,714	3,545	7.32 469
		Total	3,618	3,712	219,595	3,545	1.03 61
		Ex-Reg.	2,002	3,292	761,710	34,795	1.65 380
		Ex-Emerg.	66,076	30,787	5,775,415	1,330	.47 87
		FS-Reg.	23,836	24,267	2,944,497	8,458	1.02 124
	Second	FS-Emerg.	35,712	35,620	7,367,723	21,638	1.00 206
		CCC	14,472	18,440	1,472,009	6,325	.86 102
		Total	142,101	105,429	13,313,304	72,116	.82 122
		Ex-Reg.	50,367	22,783	5,504,600	110,529	.45 109
		Ex-Coop.	153,482	62,562	16,793,774	175,584	.41 109
Idaho Washington Montana	First	Ex-Emerg.	510,195	365,833	97,368,885	163,619	.72 191
		FS-Reg.	280,538	251,280	65,847,607	394,463	1.00 267
		FS-Emerg.	392,899	240,641	65,158,450	133,768	.68 175
		CCC	550,819	572,420	113,916,113	555,538	1.04 207
		Total	1,888,150	1,515,519	365,591,399	1,521,721	.80 194
	Second	Ex-Reg.	619	980	299,410	4,130	1.58 484
		Ex-Coop.	29,160	22,544	2,259,488	11,078	.80 80
		Ex-Reg.	117,824	112,612	20,769,198	56,311	.95 176
		FS-Reg.	150,345	149,053	18,365,499	58,647	.99 122
		FS-Emerg.	35,213	24,221	2,656,970	11,091	.69 78
Idaho Washington Montana	First	CCC	83,385	111,853	3,445,266	101,537	1.54 197
		Total	400,543	421,273	57,818,521	242,794	1.05 144
		Ex-Coop.	8,824	9,397	820,822	2,445	1.06 93
		Ex-Reg.	17,756	19,582	2,337,693	5,135	1.10 132
		FS-Reg.	30,792	37,686	2,577,333	11,721	1.22 84
	Second	FS-Emerg.	1,838	1,384	202,368	2,270	.75 110
		CCC	8,216	14,555	1,321,403	8,553	1.77 161
		Total	87,423	82,504	7,259,618	30,124	1.23 108
		Ex-Reg.	50,366	23,753	5,804,010	114,659	.47 114
		Ex-Coop.	190,466	94,503	19,873,084	189,107	.50 104
Idaho Washington Montana	First	Ex-Emerg.	645,772	498,027	120,475,766	215,265	.77 187
		FS-Reg.	431,725	438,019	87,810,438	464,851	1.01 203
		FS-Emerg.	409,947	266,246	65,017,758	147,129	.65 166
		CCC	550,819	572,420	113,916,113	555,538	1.04 207
		Total	2,358,119	2,019,396	430,669,538	1,794,639	.86 183



TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1943  
INLAND EMPIRE

State	Working	Number of Acres Worked						
		Federal			Other			
		National Forest	Public Domain	Total	State	Private	Total	Total
Idaho	First	871,361	16,642	888,003	264,138	490,994	755,132	1,643,135
	Second	203,626	5,840	209,466	50,110	103,007	153,117	362,583
	Third	27,135	1,039	28,174	8,892	20,306	29,198	57,372
	Total	1,102,122	23,521	1,125,643	323,140	614,307	937,447	2,063,090
Washington	First	69,708	315	70,023	6,832	39,678	46,510	116,533
	Second	16,371	60	16,431	3,935	7,593	11,528	27,959
	Third	1,752		1,752	2,114	2,567	4,681	6,433
	Total	87,831	375	88,206	12,881	49,838	62,719	150,925
Montana	First	108,715	40	108,755	734	18,993	19,727	128,482
	Second	7,944		7,944	1	2,056	2,057	10,001
	Third	2,244		2,244		1,374	1,374	3,618
	Total	118,903	40	118,943	735	22,423	23,158	142,101
Total	First	1,049,784	16,997	1,066,781	271,704	549,665	821,369	1,888,150
	Second	227,941	5,900	233,841	54,046	112,656	166,702	400,543
	Third	31,131	1,039	32,170	11,006	24,247	35,253	67,423
	Total	1,308,856	23,936	1,332,792	336,756	686,568	1,023,324	2,356,116

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1943  
INLAND EMPIRE

State	Ownership Class	Number of Acres			Acres on Which Working is Deferred	Total Acres White Pine
		Worked	Unworked	Total		
Idaho	National Forest	871,361	202,275	1,073,636	56,454	1,130,090
	Public Domain	16,642	13,908	30,550	1,040	31,590
	Subtotal Federal	888,003	216,183	1,104,186	57,494	1,161,680
	State	264,138	48,782	312,920	32,030	344,950
	Private	490,994	215,004	705,998	95,027	801,025
	Subtotal Other	755,132	263,786	1,018,918	127,057	1,145,975
	Total	1,643,135	479,969	2,123,104	184,551	2,307,655
Washington	National Forest	69,708	29,602	99,310		99,310
	Public Domain	315		315		315
	Subtotal Federal	70,023	29,602	99,625		99,625
	State	6,832	3,018	9,850		9,850
	Private	39,678	11,942	51,620		51,620
	Subtotal Other	46,510	14,960	61,470		61,470
	Total	116,533	44,562	161,095		161,095
Montana	National Forest	108,715	37,700	146,415	17,468	163,883
	Public Domain	40		40		40
	Subtotal Federal	108,755	37,700	146,455	17,468	163,923
	State	734	234	968		968
	Private	18,993	14,366	33,359	2,490	35,849
	Subtotal Other	19,727	14,600	34,327	2,490	36,817
	Total	128,482	52,300	180,782	19,958	200,740
Total	National Forest	1,049,784	269,577	1,319,361	73,922	1,393,283
	Public Domain	16,997	13,908	30,905	1,040	31,945
	Subtotal Federal	1,066,781	283,485	1,350,266	74,962	1,425,228
	State	271,704	52,034	323,738	32,030	355,768
	Private	549,665	241,312	790,977	97,517	888,494
	Subtotal Other	821,369	293,346	1,114,715	129,547	1,244,262
	Total	1,888,150	576,831	2,464,981	204,509	2,669,490



TABLE 11  
TOTAL RIBES BY SPECIES ERADICATED, 1923-1943  
INLAND EMPIRE

Working	Production Type	Acres	Ribes by Species							Total Ribes
			lucustris	viscosissimum	petiolare	Ribes inermis	Ribes irriguum	Ribes colaredense	Ribes triste	
First	Cutover (1940-1943)	562	24,123	413,117						437,240
	Cutover (Prior 1940)	50,554	6,001,138	10,779,971	43,999	90,333	38,795			16,954,536
	Burn (1940-1943)	8,161	789,491	2,077,346	569	17,466	9,292			2,894,183
	Reproduction	594,598	50,194,306	128,705,363	204,815	1,192,685	504,579	3,455	1,145	180,806,528
	Pole	386,741	14,202,253	12,941,260	65,233	385,968	253,455			27,633,255
	Mature	722,535	43,889,095	22,424,062	226,593	493,452	473,317	7,257	26	67,619,075
	Brush	20,383	1,123,554	5,117,010	19,257	77,111	20,835			4,483,762
	Subalpine	3,255	38,563	136,317						12,131
	Meadow-field	2,569	5,010			7,121				
	All Upland	1,754,825	115,954,491	180,465,745	560,181	2,136,301	1,282,753	10,712	1,633	301,477,857
Second	Stream	123,345	42,455,055	2,007,345	6,394,367	13,070,211	116,250	31,905	21,855	64,113,542
	All Types	1,388,150	159,405,556	182,473,091	9,955,148	15,564,601	1,399,003	42,617	22,898	365,591,399
	Cutover (1940-1943)	1,627	41,347	349,900	11,632					402,879
	Burn (1940-1943)	60	32,168	102,581						134,749
	Cutover (Prior 1940)	53,641	3,634,312	11,535,676	80,283	28,350	15,156			15,413,877
	Reproduction	165,779	7,512,375	13,352,882	51,975	111,721	31,115		2,591	21,062,659
	Pole	76,204	2,237,746	2,094,594	25,808	39,968	1,740			4,339,816
	Mature	44,430	1,198,595	1,552,699	16,546	19,098	36,159		267	3,549,564
	Brush	2,431	69,685	170,111		875				240,671
	Subalpine	231	13,553	8,902						22,457
Third	Meadow-field	348,176	15,960,755	29,743,117	191,791	135,922	84,170			46,178,695
	Stream	57,367	6,723,588	782,615	1,955,586	1,969,887	32,130		2,859	11,639,638
	All Types	405,543	22,704,393	30,525,733	2,148,367	2,164,869	116,360		159,839	57,818,321
	Cutover (1940-1943)	54	6,219	1,532						7,811
	Cutover (Prior 1940)	15,736	779,351	986,575	26,736	7,622	143			1,900,597
	Burn (Prior 1940)	184	18,806	1,042						19,848
	Reproduction	27,409	1,027,522	1,435,858	8,448	10,559	214		114	2,540,715
	Pole	7,455	240,750	179,352	42	269	6			421,019
	Mature	2,332	149,936	52,866	8					204,539
	Brush	472	6,149	15,925						22,098
All Workings	Subalpine	68	2,510	2,698						5,248
	All Upland	53,730	2,201,213	2,734,648	35,234	19,674	2,091		114	5,021,974
	Stream	13,693	1,115,149	31,695	579,829	493,846			18,124	2,257,644
	All Types	67,423	3,316,362	2,766,344	614,063	515,520	2,091		18,238	7,287,666
	Cutover (1940-1943)	2,426	1,188	1,613						3,227
	Burn (1940-1943)	60	32,168	102,581	11,632					144,349
	Cutover (Prior 1940)	119,901	10,474,701	23,362,222	151,118	126,505	54,094			34,168,719
	Reproduction	10,068	1,239,227	2,532,960	6,015	17,486	9,232			3,865,980
	Pole	448,400	16,630,749	15,216,506	31,083	43,145	535,908	3,455	3,850	204,409,302
	Mature	769,317	45,965,656	23,619,827	242,863	420,580	513,704	7,257	462	32,654,090
All Workings	Brush	28,733	1,599,038	3,383,646	19,257	98,015	20,835			70,973,177
	Subalpine	3,634	432,916	143,657						5,120,191
	Meadow-field	2,579	5,082							491,592
	All Upland	2,166,711	135,146,469	212,943,511	787,206	7,411,036	1,369,044	10,712	4,605	352,678,524
All Types	Stream	189,405	50,310,792	2,831,657	18,930,362	115,532,944	138,410	31,905	19,554	77,931,014
	All Types	2,356,116	185,497,121	215,785,168	9,717,568	17,943,980	1,517,454	42,617	191,965	430,669,538







## BLISTER RUST CONTROL WORK, CLEARWATER OPERATION, 1943

By

H. J. Faulkner, Technical Supervisor  
David Kyle, Forester, U. S. Forest Service

### INTRODUCTION

The combined blister rust control program of the Forest Service and the Bureau of Entomology and Plant Quarantine was smaller than the 1942 operation although there was a small increase in the number of workers employed by the Bureau of Entomology and Plant Quarantine.

The season was characterized by the employment of the youngest workers in the history of blister rust control and a shortage of experienced overhead and skilled workers of all kinds.

Homesickness, unfamiliarity with camp life and forest work, and attractive jobs in private industry caused a considerable turnover in workers throughout the season and an early closing of camps when weather conditions were ideal for eradication work. Handling of teen-age boys under 18 years old in groups, without the steadying influence of older boys and men and without adequate supervision of older and experienced workers presented a difficult problem. However, as the season progressed and crews gained experience in eradication work, good results were obtained. The large number of extremely young boys given training and experience this year should furnish a good nucleus of experienced workers for next season and for many years to come.

The effective season was very short due to a late spring and the workers leaving the job during August to return to school. It was July 1 before all camps were in operation, and by August 15 it was necessary to consolidate camps. All camps were closed on or before September 1.

During September and October the permanent Bureau and Forest Service blister rust control personnel, aided by two members of the Regional Blister Rust Control Office, covered a large portion of the control areas for the purpose of re-evaluation and classification of areas.

### ORGANIZATION AND ADMINISTRATION

Blister rust control activities were handled in accordance with the memorandums of understanding between the Bureau of Entomology and Plant Quarantine and the Forest Service and between the Bureau and the State of Idaho and the Clearwater Timber Protective Association. On Forest Service lands control work was organized and administered under the District Rangers. Bureau personnel had charge of all work performed by cooperative camps on state and private lands.

The blister rust control field organization was as follows:

#### Bureau of Entomology and Plant Quarantine

Harry J. Faulkner, Technical Supervisor  
John C. Conyou, Checker Foreman

#### U. S. Forest Service

David Kyle, Forest Officer  
Virgil J. Evans, Unit Supervisor

<u>Program</u>	<u>Number Camps</u>	<u>Number workers</u>
EA-Cooperative	3	140
ES-Regular	5	<u>137</u>

Total number employed on blister rust control 327

The field headquarters at Pierce, Idaho, was opened on May 4. This camp is maintained by the Bureau of Entomology and Plant Quarantine and serves as a supply and operating base for Bureau camps and also a work camp for a 25-man eradication crew. The Forest Service ranger station and central warehouse at Pierce, Idaho, served as an operating and supply base for all Forest Service camps.

The first camp was established on May 25 and the last on July 1. All camps were closed by September 1. The Forest Service experienced considerable difficulty and delay in establishing camps in the Moose City basin area on the Kelly Creek district due to the late spring and snow slides which blocked the North Fork of the Clearwater River Canyon road until late in June.

#### LOCATION AND DESCRIPTION OF AREAS

Areas worked by the Forest Service regular camps were located on Sourdough Creek in T. 40 N., R. 7 E., secs. 7 and 13 and the North Fork of the Clearwater River at the bungalow ranger station in secs. 11, 12, 13 and 14. The remainder of the Forest Service camps were located in the Moose City basin area on the Kelly Creek district as follows: mouth of Ruby Creek, T. 33 N., R. 11 E., secs. 4, 8 and 9; Alma Mine on Osier Creek, T. 33 N., R. 11 E., secs. 16, 17, 20 and 21 and Cedars Ranger Station on the North Fork of the Clearwater River, T. 40 N., R. 11 E., secs. 21 and 28.

The bungalow Ranger Station, Ruby Creek and Cedars Ranger Station camps performed first working in advanced reproduction stands on burned-over lands. Heavy ribes and very difficult working conditions were encountered on all areas. The Ruby and Cedars camps also did stream type, hand and chemical eradication on Independence Creek and the Clearwater River. The Alma Mine camp was engaged primarily in the chemical eradication of Ribes petiolare on Osier Creek and its tributaries. The Sourdough Creek camp worked entirely on recently cutover lands involving the eradication of large numbers of small ribes.

The work of the Bureau cooperative camps was again concentrated in the vicinity of Pierce and Headquarters, Idaho, on recently cutover lands. The camp areas were located as follows: Upper Reeds Creek, T. 33 N., R. 6 E., secs. 13, 19 and 30 and T. 33 N., R. 5 E., secs. 24, 25 and 36; Clearwater Timber Protective Association headquarters on Reeds Creek and Deer Creek in T. 33 N., R. 5 E., secs. 22, 23, 24, 26 and 27 and blister rust control headquarters near Pierce, Idaho, on a tributary of Orofino Creek in T. 36 N., R. 5 E., secs. 10, 11, 16, 20, 21 and 28.

## METHODS AND EQUIPMENT

Standardized methods and equipment on both hand and chemical eradication were used through the operation. With inexperienced workers and limited supervision the working of from three to five 3-man crews in adjacent crew lanes under the supervision of a straw boss has proven to be the most satisfactory method for upland work. This method requires the laying of string lanes in advance of the crews.

## SURVEYS AND STATUS OF CONTROL

Plans and procedures were set up during the previous winter for a complete re-evaluation and classification of the control area. The purposes are, first, to provide a complete record of information on individual areas essential in the over-all planning of control work and, second, to segregate the control area into classes to show areas warranting highest priority for protection, deferred areas and drop areas and to evaluate the white pine-producing qualities of work areas.

The first step in carrying out this plan was a review of the entire control unit for classification of areas where adequate information was already available. This was accomplished at a joint meeting of Forest Service and Bureau personnel held at field headquarters late in August.

The second step called for examination of those areas where up-to-date or adequate information was not available. Good progress was made on the field examinations during September and October, the major portion of the job being completed.

The small blocks of isolated control area on Minnesaka and Isabella Creek drainages and the narrow stringer along the North Fork of the Clearwater River extending from the Canyon Ranger Station to the Kelly Creek Ranger Station were eliminated from further consideration for control work. No work has been done on these areas, and the rust has become generally established. Eradication on these areas would be costly and difficult, and with the rust already present it would not be advisable to attempt control.

Advance pole stands on Eldorado, Lolo, Musselshell, French, Tamarack, Lodge and Tumble Creek drainages are generally high quality stands, and with the exception of stream type mop-up very little work will be necessary to protect them.

In general, reproduction and pole stands on the National Forest lands that have been worked are in good condition. Future work will be confined to stream type mop-up and reeradication on parts of the upland where surveys show additional work is necessary to place the areas on a maintenance basis.

White pine plantations on Sylvan, Alder and the head of Beaver Creek will receive first consideration for future control work on the National Forest. One or more workings have been done on these areas but complete protection has not been established. Due to the young age class of the pine they are extremely vulnerable to serious damage over a short period of time and from a few fires.

Due to a shortage of qualified personnel, disease surveys and post check have lagged far behind the needs for disease and ribes information on many areas and should be given high priority when qualified men are again available for survey work.

On the Timber Protective Association lands, the protection of young reproduction stands on recently cutover areas is the major control problem. The present small control programs and accelerated cutting of white pine, due to increased demands for lumber brought about by the war, necessitate the selecting of only the better pine producing areas for protection. This is a difficult and complex problem due to the great variation in overwood densities, available seed source, site, methods of brush disposal and many other factors that influence the chances of establishing white pine following logging and protecting it from blister rust. If an area does not have an adequate seed source following cutting, the chances of establishing white pine are poor. Ribes and pine germinate at the same time and heavy infection may take place before the ribes can be removed. Working will be deferred on these areas under the present sized program.

First priority for working under the present program will be given to areas where reproduction is already established and partially protected by one or two workings.

The Scordfield basin, comprising an area of approximately 4,500 acres of advance reproduction was found to be generally in fair condition considering that the upland has had only one working. Rust has spread generally over the area and some damage has occurred. A complete reworking of the stream type and a partial working of the upland will be necessary to protect the stand. This work should be completed as soon as possible.

A considerable acreage of white pine cutover lands, occurring along the western side of the control area and still supporting a heavy residual stand of other species, will be dropped from the control area or put in a deferred classification. This portion of the control area approaches the limits of the white pine belt, and the original stand contained a high percentage of species other than white pine. The removal of the white pine and cedar failed to open the canopy of these stands sufficiently to permit the re-establishment of white pine. This is generally true of Heywood, Grasshopper, Winter, Lower Orofino, Upper Silver, Elkberry and Beaver Creek drainages. These areas were dropped from further consideration for control work if no white pine seed source was present to restock the stands in the event the mixed species were harvested. Smaller blocks of heavy residual stands of mixed species occur through the entire cutover area.

Many of the cutover areas have been slow, or failed entirely, to restock to white pine due to a lack of white pine seed source. These areas will be held in a deferred status if there is a possibility of their becoming good white pine stands through natural seeding or planting. Where the growth of other species has eliminated the further establishment of white pine, they will be dropped from the control area.

# CHECKING AND PINE DISEASE SURVEY

Checking was limited to sample and administrative checks by the eradication supervisor during the regular season. After the camps were closed a two per cent regular check was run on 3,145 acres of upland area by the eradication supervisor.

While no systematic disease surveys were run this season, an extensive sample of disease conditions was gained in conjunction with other fall surveys and through inspections by the overhead throughout the season. The results showed that a heavy wave of infection occurred in 1941 throughout the control area.

## STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

### EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943 CLEARWATER OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 7,001.97
	Regular BLR-3-4	39,814.54
	Subtotal	\$ 46,816.51
State of Idaho	State BLR-3-4	3,815.03
Clearwater Timber Protective Association	Private BLR-3-4	336.68
	Subtotal	\$ 4,201.71
Forest Service	Regular BLR-4	\$ 71,902.85
Total		\$122,921.07

TABLE 2

### CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943 CLEARWATER OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$5,529.10			\$ 5,529.10	\$ 2,990.00	\$ 8,519.10
Sal. temp. men	919.15	\$ 6,235.09	\$ 511.98	7,666.22	11,651.59	19,317.81
Wages, temp. labs.		26,774.33	3,115.66	29,899.99	33,687.36	63,577.35
Subs. supplies	47.24	6,067.19	574.07	6,683.50	13,425.08	20,113.58
Equipment	1.48	9.94		11.42	2,907.47	2,918.89
Travel & transp.	296.52	362.82		659.34	921.87	1,581.21
Other supplies	203.48	365.17		573.65	1,319.48	1,893.13
Total	\$7,001.97	\$39,814.54	\$4,201.71	\$51,018.22	\$71,902.85	\$122,921.07





SUMMARY OF RIBES ERADICATION, 1943  
CLEARWATER OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray	Ribes Remaining	
								Per Acre Bushes	Live Stem
Cutover (1940-1943)	552	1,416		1,968	2,811	833,928		24.3	35.0
Cutover (Prior 1940)		936	1,940	2,876	2,879	266,909		11.9	11.4
Reproduction	450	316		766	2,650	152,595			
All Upland	1,002	2,668	1,940	5,610	8,340	1,253,432		16.7	20.4
Stream (Hand)	293	60	39	392	881	96,422			
Stream (Chemical)	208	60	39	307	647	27,513	9,571		
All Stream	293	60	39	392	1,528	123,935			
All Types	1,295	2,728	1,979	6,002	9,868	1,377,567		16.7	20.4

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining	
					Man- Days	Ribes	Gallons Spray	Per Acre Bushes	Live Stem
Cutover (1940-1943)	552	1,018	437,240		1.84	792			
Reproduction	450	1,802	106,083		4.00	236			
All Upland	1,002	2,820	543,323		2.81	542			
Stream (Hand)	293	720	84,942		2.46	290			
Stream (Chemical)	208	409	18,678	6,226	1.97	90	30		
All Stream	293	1,129	103,620		3.85	354			
All Types	1,295	3,949	646,943		3.05	500			

TABLE 3B - SECOND WORKING

Cutover (1940-1943)	1,416	1,793	396,688		1.27	280		24.3	35.0
Cutover (Prior 1940)	936	1,055	123,438		1.13	132		8.3	10.8
Reproduction	316	848	46,512		2.68	147			
All Upland	2,668	3,696	566,638		1.39	212		16.1	22.6
Stream (Hand)	60	99	5,439		1.65	91			
Stream (Chemical)	60	46	2,700	900	1.77	45	15		
All Stream	60	145	8,139		2.42	136			
All Types	2,728	3,841	574,777		1.41	211		16.1	22.6

TABLE 3C - THIRD WORKING

Cutover (Prior 1940)	1,940	1,824	143,471		.94	74		18.7	12.1
Stream (Hand)	39	62	6,041		1.59	155			
Stream (Chemical)	39	192	6,135	2,445	4.92	157	63		
All Stream	39	254	12,176		6.51	312			
All Types	1,979	2,078	155,647		1.05	79		18.7	12.1





TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1943  
CLEARWATER OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Sprey	Per Acre Basis			Ribes Remaining Per Acre	
						Man- Days	Ribes	Gallons Per Sprayed Area	Bushes	Live Stem
First	FS-Reg.	1,295	3,949	646,943	6,226	3.05	500	30		
	EQ-Coop	2,352	2,848	520,126		1.21	221		16.1	22.6
Second	FS-Reg.	376	993	54,651	900	2.64	145	15		
	Total	2,728	3,841	574,777	900	1.41	211	15		
Third	EQ-Coop.	1,979	2,078	155,647	2,445	1.05	79	63	18.7	12.1
	EQ-Coop.	4,331	4,926	675,773	2,445	1.14	156	63	16.7	20.4
All Workings	FS-Reg.	1,671	4,942	701,594	7,126	2.96	420	27		
	Total	6,002	9,868	1,877,567	9,571	1.64	229	31	16.7	20.4

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943  
CLEARWATER OPERATION

State	Working	Number of Acres Worked					Total
		By Forest Service		By Bureau of Entomology and Plant Quarantine		Total	
		National Forest	State	Private	Total		
Idaho	First	1,295				1,295	
	Second	376	392	1,960	2,352	2,728	
	Third		168	1,811	1,979	1,979	
	Total	1,671	560	3,771	4,331	6,002	

Note: Only national forest worked by Forest Service, and only state and private worked by Bureau of Entomology and Plant Quarantine.

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1943  
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	
First	Cutover (1940-1943)	552	24,123	413,117		437,240
	Reproduction	450	35,172	70,911		106,083
	All Upland	1,002	59,295	484,028		543,323
	Stream	293	84,614	328	18,678	103,620
	All Types	1,295	143,909	484,356	18,678	646,943
Second	Cutover (1940-1943)	1,416	37,258	347,798	11,632	396,688
	Cutover (Prior 1940)	936	9,831	111,628	1,979	123,438
	Reproduction	316	33,225	13,287		46,512
	All Upland	2,668	80,314	472,713	13,611	566,638
	Stream	60	5,439		2,700	8,139
Third	All Types	2,728	85,753	472,713	16,311	574,777
	Cutover (Prior 1940)	1,940	40,369	96,192	6,910	143,471
	Stream	39	4,172	518	7,486	12,176
	All Types	1,979	44,541	96,710	14,396	155,647
	Cutover (1940-1943)	1,968	61,381	760,915	11,632	833,928
All Workings	Cutover (Prior 1940)	2,876	50,200	207,820	8,889	266,909
	Reproduction	766	68,397	84,198		152,595
	All Upland	5,610	178,978	1,052,933	20,521	1,253,432
	Stream	392	94,225	846	28,854	123,935
	All Types	6,002	274,203	1,053,779	49,385	1,377,387



SUMMARY OF RIBES ERADICATION, 1939-1943  
CLEARWATER OPERATION

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Cutover (1940-1943)	552	1,416		1,968	2,811	833,928	
Burn (1940-1943)		60		60	232	134,749	
Cutover (Prior 1940)	27,726	33,989	10,875	72,590	73,067	22,315,093	
Burn (Prior 1940)	1,045	432		1,477	1,777	1,285,330	
Reproduction	71,329	21,487	2,324	95,140	142,587	36,913,755	
Pole	29,211	13,995		43,206	24,030	4,896,421	
Mature	219,289	16,067		235,356	107,681	24,234,186	
Brush	2,795	79		2,874	2,578	732,633	
Subalpine	122			122	118	53,948	
Meadow-Field	1,890			1,890			
All Upland	353,959	87,525	13,199	454,683	554,681	91,401,043	
Stream (Hand)	42,277	22,101	2,420	66,798	65,195	14,426,521	
Stream (Chemical)	15,016	5,875	537	21,428	39,843	2,763,953	921,511
Stream (Mechanical)	65	13		78	1,258	188,983	
Stream (Zone)		1,666		1,666	1,129	280,094	
All Stream	42,342	23,790	2,420	68,542	107,425	17,559,551	
All Types	396,301	111,305	15,619	523,225	462,106	109,060,574	

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis Man-Days	Ribes	Gallons Spray
Cutover (1940-1943)	552	1,018	437,240		1.84	792	
Cutover (Prior 1940)	27,726	25,888	10,610,089		.93	383	
Burn (Prior 1940)	1,045	1,246	917,609		1.19	878	
Reproduction	71,329	108,331	33,428,751		1.52	469	
Pole	29,211	16,138	3,785,629		.55	130	
Mature	219,289	99,880	23,422,354		.46	107	
Brush	2,795	2,536	729,247		.91	261	
Subalpine	122	118	53,948		.97	442	
Meadow-Field	1,890						
All Upland	353,959	255,155	73,394,867		.72	207	
Stream (Hand)	42,277	45,712	11,484,889		1.08	272	
Stream (Chemical)	15,016	31,155	2,393,370	794,130	2.07	159	53
Stream (Mechanical)	65	1,233	188,983		18.97	2,907	
All Stream	42,342	78,100	14,057,242		1.84	532	
All Types	396,301	333,255	87,442,109		.84	221	

TABLE 7B - SECOND WORKING

Cutover (1940-1943)	1,416	1,793	396,688		1.27	280	
Burn (1940-1943)	60	232	134,749		3.87	2,246	
Cutover (Prior 1940)	33,989	35,423	10,633,485		1.04	513	
Burn (Prior 1940)	432	531	367,721		1.23	851	
Reproduction	21,487	31,058	3,237,981		1.45	151	
Pole	13,995	7,892	1,110,792		.56	79	
Mature	16,067	7,801	811,832		.49	51	
Brush	79	42	3,386		.53	43	
All Upland	87,525	84,772	16,696,654		.97	191	
Stream (Hand)	22,101	17,670	2,689,294		.80	122	
Stream (Chemical)	5,875	8,142	359,755	119,985	1.39	61	20
Stream (Mechanical)	13	25			1.92		
Stream (Zone)	1,666	1,129	280,094		.68	168	
All Stream	23,780	26,966	3,329,143		1.13	140	
All Types	111,305	111,738	20,025,777		1.00	180	

TABLE 7C - THIRD WORKING

Cutover (Prior 1940)	10,875	11,756	1,072,519		1.08	99	
Reproduction	2,324	2,998	247,023		1.29	106	
All Upland	13,199	14,754	1,319,542		1.12	100	
Stream (Hand)	2,420	1,813	252,338		.75	104	
Stream (Chemical)	537	546	20,408	7,336	1.02	39	14
All Stream	2,420	2,359	273,146		.97	113	
All Types	15,619	17,113	1,592,688		1.10	102	



TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1943  
CLEARWATER OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man- Days	Ribes	Gallons Per Sprayed Area
First	Eq-Reg.	4,412	5,273	1,129,228	79,864	1.20	256	41
	Eq-Coop.	24,005	16,862	3,759,434	118,973	.70	157	34
	Eq-Emerg.	81,649	73,206	20,560,823	88,983	.90	252	75
	FS-Reg.	77,340	62,447	20,896,355	129,886	.81	270	37
	FS-Emerg.	43,963	36,790	14,033,179	11,594	.84	319	79
	CCC	164,932	139,577	27,053,090	364,790	.84	164	73
	Total	396,301	333,255	87,442,109	794,190	.84	221	52
Second	Eq-Coop.	7,215	5,945	899,778	8,404	.82	125	5
	Eq-Emerg.	45,995	45,687	9,150,811	45,754	.97	195	29
	FS-Reg.	25,309	27,162	4,329,171	12,450	1.07	171	5
	FS-Emerg.	10,747	7,526	689,942	10,051	.70	64	22
	CCC	21,059	25,438	4,946,075	43,296	1.21	235	27
	Total	111,305	111,758	20,025,777	119,985	1.00	180	16
Third	Eq-Coop.	6,492	6,599	399,712	2,445	1.05	64	63
	Eq-Emerg.	5,326	6,404	676,459	2,110	1.20	127	19
	FS-Reg.	1,232	1,231	102,139		1.00	79	
	FS-Emerg.	1,198	1,066	171,901	2,270	.89	143	13
	CCC	1,511	1,753	242,478	511	1.15	160	2
	Total	15,619	17,113	1,592,698	7,336	1.10	102	13
All Workings	Eq-Reg.	4,412	5,273	1,129,228	79,864	1.20	256	41
	Eq-Coop.	37,512	29,406	5,068,924	129,822	.79	135	25
	Eq-Emerg.	133,970	125,277	30,599,093	136,847	.94	227	47
	FS-Reg.	103,941	90,900	25,327,664	142,356	.87	244	25
	FS-Emerg.	55,908	45,382	14,895,022	24,015	.81	266	31
	CCC	187,432	165,858	32,241,643	408,597	.89	172	60
	Total	523,225	462,106	109,050,574	921,511	.88	208	39

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1943  
CLEARWATER OPERATION

Working	Number of Acres Worked						
	Federal			Other			Total
	National Forest	Public Domain	Total	State	Private	Total	
First	151,097	3,690	154,777	78,834	162,690	241,524	396,301
Second	49,459	628	50,087	15,200	46,018	61,218	111,305
Third	3,780	12	3,792	1,345	10,482	11,827	15,619
Total	204,336	4,320	208,656	95,379	219,190	314,569	523,225

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1943  
CLEARWATER OPERATION

Ownership Class	Number of Acres			Acres on Which Working Is Deferred	Total acres White Pine
	Worked	Unworked	Total		
National Forest	151,097	44,773	195,870	8,860	204,730
Public Domain	3,680	350	4,030		4,030
Subtotal Federal	154,777	45,123	199,900	8,860	208,760
State	78,834	2,956	81,790	11,200	92,990
Private	162,690	17,620	180,310	27,940	208,250
Subtotal Other	241,524	20,576	262,100	39,140	301,240
Total	396,301	65,699	462,000	48,000	510,000



TABLE 11  
TOTAL RIBES BY SPECIES ERADICATED, 1929-1943  
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species						Total Ribes
			Ribes lacustris	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	
First	Cutover (1940-1943)	552	24,123	413,117					437,240
	Cutover (Prior 1940)	27,726	2,100,601	8,431,923	38,603	27,752	11,210		10,610,089
	Burn (Prior 1940)	1,045	74,796	838,377	568		3,868		917,609
	Reproduction	71,329	7,928,610	25,245,707	75,977	47,326	131,131		33,428,751
	Pole	29,211	2,467,634	1,278,820	31,617	6	7,090	462	3,785,629
	Mature	219,289	16,561,450	6,795,503	197,832	107,922	59,621	26	23,422,354
	Brush	2,795	210,516	490,931	17,270	114	10,416		729,247
	Subalpine	122	53,500	448					53,948
	Meadow-Field	1,890							
	All Upland	353,959	29,121,230	43,494,826	361,857	183,120	223,336	488	72,384,557
	Stream	42,342	10,239,770	324,583	2,765,661	701,834	25,394		14,057,242
Second	All Types	396,301	39,361,000	43,819,409	3,127,528	884,954	248,730	488	87,442,109
	Cutover (1940-1943)	1,416	37,258	347,798	11,632				396,688
	Burn (1940-1943)	60	32,168	102,581					134,749
	Cutover (Prior 1940)	33,989	1,184,141	9,356,959	79,585	724	12,076		10,623,455
	Burn (Prior 1940)	432	19,437	342,837	5,447				367,721
	Reproduction	21,497	753,357	2,472,573	12,011	4	36		3,227,991
	Pole	13,995	545,661	548,795	16,095	1	250		1,110,792
	Mature	16,067	395,208	400,473	15,768	116		267	811,832
	Brush	79	424	2,962					3,396
	All Upland	87,625	2,967,654	13,574,969	140,538	845	12,552	267	16,696,634
	Stream	23,780	1,893,616	516,470	826,524	76,716	9,141	6,676	3,329,143
Third	All Types	111,305	4,861,270	14,091,438	967,062	77,561	21,693	6,943	20,025,777
	Cutover (Prior 1940)	10,875	204,423	841,207	26,736		143		1,072,519
	Reproduction	2,324	126,520	118,555	1,934		14		247,023
	All Upland	13,199	330,953	959,762	28,670		157		1,319,542
	Stream	2,420	188,778	2,573	58,979	22,816			273,146
	All Types	15,619	519,731	962,335	87,649	22,816	157		1,592,698
	Cutover (1940-1943)	1,968	61,381	760,915	11,632				833,928
	Burn (1940-1943)	60	32,168	102,581					134,749
	Cutover (Prior 1940)	72,590	3,489,175	18,620,089	144,924	28,476	23,429		22,316,093
	Burn (Prior 1940)	1,477	94,223	1,181,214	6,015		3,968		1,285,330
	Reproduction	95,140	8,808,487	27,836,835	89,922	47,330	131,181		36,913,755
All Workings	Pole	43,206	5,013,295	1,827,605	47,712	7	7,340	462	4,896,421
	Mature	255,356	16,656,658	7,195,976	213,600	108,038	59,621	293	24,234,186
	Brush	2,874	210,940	493,893	17,270	114	10,416		722,633
	Subalpine	122	53,500	448					53,948
	Meadow-Field	1,890							
	All Upland	454,683	32,419,837	58,029,556	531,075	183,965	255,855	755	91,401,043
	Stream	58,542	12,522,164	843,626	3,651,164	801,366	34,555	6,276	17,659,531
	All Types	513,225	44,942,001	58,873,182	4,182,239	985,331	270,390	7,431	109,060,574





## BLISTER RUST CONTROL WORK, ST. JOE OPERATION, 1943

By

F. J. Heinrich, Technical Supervisor

D. J. Moore, Pathologist, U. S. Forest Service

W. F. Painter, Assistant Operation Supervisor

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### INTRODUCTION

White pine blister rust control activities and accomplishments during the 1943 field season are explained and summarized in the following report. This report also summarizes in tabular form the progress made since 1929 when control work first started.

The control job is well started but not yet completed. Out of the 884,925 acres of white pine type originally included within the control boundary 536,902 or 62 per cent has been worked once and 165,739 or 19 per cent has received subsequent workings.

The steady inroads of the rust since its establishment in 1923 and the fluctuations in the size of program have called for continual adjustment in work policies. During the past season careful attention was given to all areas within the control boundary in order that they may be classified correctly. As a result of the area analysis approximately 25 per cent of the control area supporting the most valuable stands of young pine was placed in the highest working priority, 58 per cent was placed in a deferred status denoting lower priority in values or areas on which working may be temporarily deferred and 17 per cent is classed for dropping from the control area.

### ORGANIZATION AND ADMINISTRATION

Blister rust control work on the St. Joe operation was organized and administered in accordance with the cooperative working agreements. Full responsibility for the administration of the regular Forest Service camps came within the jurisdiction of the Forest Service personnel. Technical advice was afforded by the Bureau of Entomology and Plant Quarantine personnel as in previous years. All phases of control activities for the cooperative camps on state and private lands were handled by the Bureau personnel.

The blister rust control 1943 field organization was as follows:

#### Bureau of Entomology and Plant Quarantine

F. J. Heinrich, Technical Supervisor  
W. F. Painter, Assistant Operation Supervisor in charge of checking

#### U. S. Forest Service

D. J. Moore, Forest Officer  
Byron Amsbaugh, Unit Supervisor

<u>Program</u>	<u>Number Camps</u>	<u>Number Workers</u>	<u>Number Checkers</u>
Co-operative	2	140	1
Regular	7	<u>390</u>	1

Total number employed on blister rust control 530

Field headquarters at Clarkia, Idaho, maintained by the Bureau were used as an operating base for Bureau and some Forest Service activities. Warehousing and supplying of subsistence for all classes of camps were handled through the Clarkia Ranger Station.

The first Forest Service camp was established May 11. Additional camps were put into operation as men became available. The two Bureau and seven Forest Service camps were fully manned and crews working by June 18. All camps were closed by August 31. The early closing was necessitated by boys returning to school.

Boys 16 and 17 years of age and nearly 100 per cent inexperienced in woods work along with inexperienced foremen created many new problems. With careful planning and intensive training satisfactory work was accomplished. This personnel situation was due entirely to the fact that employees of past years were either in the armed forces or other vital war work. An effort was made to secure experienced men but they were not available.

The Forest Service secured their boys by local recruitment and through the Forest Service labor pool. This pool consisted of the men power recruited by the supervisors' offices throughout the country. Men from this pool were then sent to the different forests where there was a shortage of man power. The policy worked quite satisfactorily. A large number of boys was secured in this manner who otherwise would not have been available. The workers for the Bureau camps were recruited through the State Forester's Office, Boise, Idaho, and the Blister Rust Control Office in Spokane, Washington.

In the future a more careful selection of boys must be made. There were too many boys hired who were unsuited to woods work resulting in a high labor turnover. This proved both costly to the employee as well as the employer, and in several instances resulted in adverse criticism of the governmental agencies involved.

#### LOCATION AND DESCRIPTION OF AREAS

Renfro Creek area consisted primarily of open pole, 40-60 year age class. The ribs were light and working conditions were generally not difficult. The work this year was performed in the S.  $\frac{1}{2}$ , S.  $\frac{1}{2}$ , secs. 4 and 5; the N.  $\frac{1}{2}$ , N.  $\frac{1}{2}$ , secs. 8 and 9 and a small portion on the east side of sec. 7; all in T. 44 N., R. 1 E. The 1943 work was all second working and saw the completion of all work in this block. This area has now been protected.

Willow Creek area included 300 acres of 1939-40 plantation and natural reproduction along with 550 acres of open pole type. The younger stands have been given three workings and the pole type, two workings. The work was performed

in the W.  $\frac{1}{2}$ , sec. 12; W.  $\frac{1}{4}$ , E.  $\frac{1}{2}$ , sec. 12; W.  $\frac{1}{2}$ , sec. 13; N.E.  $\frac{1}{4}$ , sec. 14 in T. 43 N., R. 3 W. and the S.E.  $\frac{1}{4}$ , N.W.  $\frac{1}{4}$ , sec. 7, T. 43 N., R. 2 W. The pole type is now protected but the plantation will need a small amount of additional work. There is one camp season's work remaining in this drainage.

Hidden Creek area camp worked in the upper end of the West Fork of the St. Maries River and Long Slim Creek drainages. Work was performed in the E.  $\frac{1}{2}$ , sec. 26; S.W.  $\frac{1}{4}$ , sec. 26; E.  $\frac{1}{2}$ , N.W.  $\frac{1}{4}$ , sec. 26; W.  $\frac{1}{2}$ , N.W.  $\frac{1}{4}$ , sec. 35; S.  $\frac{1}{2}$ , sec. 27; S.E.  $\frac{1}{4}$ , sec. 28; S.  $\frac{1}{2}$ , N.E.  $\frac{1}{4}$ , sec. 28; N.E.  $\frac{1}{4}$ , sec. 33 and the N.  $\frac{1}{2}$ , N.W.  $\frac{1}{4}$ , sec. 34, T. 42 N., R. 1 E. The work block consisted of 1,290 acres of which 130 acres were difficult stream type and the remainder, open reproduction, 20-40 year age class. Three workings have now been given 600 acres and the remainder covered for the second time.

Catspur camp area of 115 acres of open reproduction 20-30 year age class, 1,200 acres of open pole 60-80 year age class and 40 acres of stream type lying in the Catspur and Log Creek drainages. This area consists of that portion of sec. 19 in the Catspur drainage; all of sec. 20 except a portion in the S.E.  $\frac{1}{4}$ ; all that portion in N.W.  $\frac{1}{4}$ , sec. 29 lying north of Catspur Creek and the west side of Log Creek in sec. 30, T. 42 N., R. 2 E. The infection and ribes were light on the upland but the stream type was heavy working. All of this area has been given three workings and most of it will be placed on maintenance.

Maizie Creek camp area consisted of 550 acres of open reproduction, 560 acres of open pole and 130 acres of stream type. The area is in the West Fork of the St. Maries River and Long Slim Creek drainages. 1943 work was performed in N.E.  $\frac{1}{4}$ , sec. 24; S.  $\frac{1}{2}$ , sec. 24; all that portion of sec. 25 lying north of Long Slim Creek and S.  $\frac{1}{2}$ , S.E.  $\frac{1}{4}$ , sec. 23, T. 42 N., R. 1 E; S.W.  $\frac{1}{4}$ , sec. 19 and N.W.  $\frac{1}{4}$ , sec. 30, T. 42 N., R. 2 E. Ribes and infection were light except along the streams. All area was worked for the third time except that area in S.E.  $\frac{1}{4}$ , sec. 23, T. 42 N., R. 1 E. which received second working.

Railroad Creek camp area was made up of white pine plantations on Ramsey and Railroad Creeks, which were established in 1915. This area is that portion of the S.W.  $\frac{1}{4}$ , sec. 27 lying south of the North Fork of St. Joe River; N.W.  $\frac{1}{4}$ , sec. 34; W.  $\frac{1}{2}$ , N.E.  $\frac{1}{4}$ , sec. 34 and a ten chain strip along the east side of Railroad Creek from the center of sec. 23 to the center of sec. 33, all in T. 47 N., R. 5 E. A total of 300 acres was worked by this camp which was mostly upland. The ribes only ran 50 per acre but the working conditions were difficult due to the brush density and windfalls. All ground covered by this camp was third working.

Bullion Creek camp area was almost equally divided between stream type and upland acreage with 200 acres of each. The 1943 work area was that portion of sec. 36, T. 47 N., R. 5 E. lying south of North Fork of St. Joe River and a five chain strip on the north side of sec. 1, T. 46 N., R. 5 E. A small plantation in the N.W.  $\frac{1}{4}$ , sec. 31, T. 47 N., R. 5 E. was also worked. Most of the area was worked for the third time with 25 ribes per acre removed. The acreage receiving second working supported 60 ribes per acre. The working conditions were difficult due to windfalls on the upland and the dense growth intermingled with numerous beaver dams on stream type.

The two cooperative camps were located on Long Meadow Creek, Camp 201 at Round Meadows and Camp 202 on Butterfield Meadows. A total of 3,675 acres of area logged during the period of 1931-37 was worked. Second working was performed on 2,690 acres. This area was located in S.  $\frac{1}{2}$ , sec. 35, T. 40 N., R. 1 E.; N.  $\frac{1}{2}$ , sec. 2, T. 39 N., R. 1 E. and the area south of road in the S.  $\frac{1}{2}$ , sec. 2, area south of main stream in sec. 9, and secs. 10, 11, 12 and a portion in sec. 14.

The remainder was first working. This included all of sec. 15 except the N.W.  $\frac{1}{4}$ , N.  $\frac{1}{2}$ , N.W.  $\frac{1}{4}$ , sec. 14; S.  $\frac{1}{2}$ , sec. 21 and the N.  $\frac{1}{2}$ , N.E.  $\frac{1}{4}$ , sec. 28.

This area formerly produced a good stand of pine. The area is cut up and somewhat patchy but as a whole is coming back well to white pine. The area contains only light infection and the protection is not costly.

There still remains some unworked area in T. 39 N., R. 1 E, secs. 21 and 28, that supports good reproduction and should be protected.

#### METHODS AND EQUIPMENT

Standard approved methods for hand ribes eradication were used throughout the season. In nearly all cases string lanes were laid in advance of the crew. Two to three men equipped with ribes picks worked within each lane. A crew leader worked behind directing the crew and reworking the ground. A straw boss was in charge of three to four crews working in gang formation. This method worked particularly well with the youthful labor employed.

Chemical ribes eradication was on a small scale this year as the work was mostly mop-up and the Ribes petiolare were very scattered.

The Forest Service personnel held a three-day training school and gave all camp bosses intensive training prior to the establishment of camp. The two bureau camp bosses were trained on the job. Intensive training was given all workers throughout the summer.

#### CHECKING AND SURVEYS

The regular check formerly made on work areas was discontinued temporarily in 1943. The few experienced eradication men who might have been trained as checkers were used in training and directing the inexperienced workers in ribes eradication. Occasional sample checks were made on upland areas to give the camp foremen some index as to the quality of crew work.

With the assistance of experienced checkers a careful check was made on all streams sprayed for R. petiolare. The streams in most cases were checked 100 per cent and all missed R. petiolare bushes were tagged. The tagging of the missed ribes greatly facilitated the respray work and insured a complete coverage of all streams.

There is a definite need for regular check on worked areas and men should be trained and used for this work whenever possible. Pine disease surveys were carried on to a limited extent during the past season. A total of 13.8 strip

miles was run on areas that were being surveyed to determine white pine stocking. The results of the disease survey are as follows:

	T.	R.	Sections	Chains Run	Trees Exam.	Per Cent Trees Infected	Per Cent Fatal	Damage to Present stocking
Marble Cr.	44 N.	2-3 E.	20, 21, 25 to 36	501	1,001	40	33	15 %
Cedar Cr.	42 N.	1 E.	1, 2	70	140	33	27	10 %
Hatton Cr.	43 N.	1 E.	3, 4	233	1,667	2	2	None
	44 N.	1-2 E.	13, 13					
Mica Cr.	45 N.	2 E.	31 to 33	301	462	45	45	35 %

In examining the above table one notes that the per cent of infection does not mean that the stand is damaged to the same extent. Overstocked areas can be quite heavily infected without damage to the stand.

Considerable pine survey work was performed on the St. Joe operation during the past field season. A systematic survey was made on specific areas to determine the degree of stocking, general infection and working conditions. This work was performed by the Forest Service camp bosses at the close of the regular field season.

#### PINE SURVEY ACREAGE

Willow Creek	-	2,400 acres
Cedar Creek	-	2,500 acres
Mica Creek	-	9,800 acres
Marble Creek	-	<u>14,200</u> acres

Total Acres Covered 28,700

A more general survey was run on all areas upon which more specific information was needed for correct classification. Areas were placed in classes based upon a number of influencing characteristics affecting the stands present and future values.



TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943  
ST. JOE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 14,263.91
	Regular BLR-3-4	31,445.69
	Subtotal	\$ 45,709.60
State of Idaho and Potlatch Timber Protective Association	State and Private BLR-3-4	\$ 4,018.35
Forest Service	Regular BLR-4	\$131,450.50
Total		\$181,178.45

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943  
ST. JOE OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$12,471.49			\$12,471.49	\$ 6,299.42	\$ 18,770.91
Sal. temp. men	151.32	\$ 6,034.63	\$ 289.83	6,475.78		6,475.78
Wages, temp. labs.		20,541.01	3,385.85	23,926.86	95,665.53	119,592.39
Subs. supplies	27.07	4,168.19	342.67	4,537.93	19,720.89	24,258.82
Equipment	34.06	32.61		66.67	6,911.80	6,978.47
Travel & transp.	537.97	253.32		791.29	1,649.03	2,440.32
Chemicals						
Twine						
Other Supplies	1,042.00	415.93		1,457.93	1,203.83	2,661.76
Total	\$14,263.91	\$31,445.69	\$4,018.35	\$49,727.95	\$131,450.50	\$181,178.45

SUMMARY OF RIBES ERADICATION, 1943  
ST. JOE OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Men-Days	Total Ribes	Gallons Spray
Cutover (Prior 1940)	985	2,651	45	3,681	3,552	226,067	
Reproduction		759	2,064	2,823	5,440	196,383	
Pole		858	2,102	2,960	2,009	61,861	
All Upland	985	4,268	4,211	9,464	11,001	484,311	
Stream (Hand)			495	495	1,494	65,301	
Stream (Chemical)			286	286	235	11,736	3,912
All Stream			495	495	1,729	77,037	
All Types	985	4,268	4,706	9,959	12,730	561,348	

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Men-Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man- Days	Ribes	Gallons Spray
Cutover (Prior 1940)	985	762	138,580		.77	141	

TABLE 3B - SECOND WORKING

Cutover (Prior 1940)	2,651	2,749	86,992		1.04	33	
Reproduction	759	935	32,906		1.23	43	
Pole	858	672	20,224		.79	24	
All Types	4,268	4,356	140,122		1.02	33	

TABLE 3C - THIRD WORKING

Cutover (Prior 1940)	45	41	495		.91	11	
Reproduction	2,064	4,505	163,477		2.18	79	
Pole	2,102	1,337	41,637		.64	20	
All Upland	4,211	5,883	208,609		1.40	49	
Stream (Hand)	495	1,494	65,301		3.02	132	
Stream (Chemical)	286	235	11,736	3,912	.32	41	14
All Stream	495	1,729	77,037		3.49	156	
All Types	4,706	7,612	282,646		1.62	60	





TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1943  
ST. JOE OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre basis		
						Man- Days	Ribes	Gallons Per Sprayed Area
First	Eq-Coop.	985	762	138,580		.77	141	
Second	Eq-Coop.	2,645	2,731	85,044		1.03	32	
	FS-Reg.	1,623	1,625	55,078		1.00	34	
	Total	4,268	4,356	140,122		1.02	33	
Third	Eq-Coop.	45	41	495		.91	11	
	FS-Reg.	4,661	7,571	282,151	3,912	1.62	61	14
	Total	4,706	7,612	282,646	3,912	1.62	60	14
All Workings	Eq-Coop.	3,675	3,534	224,119		.96	61	
	FS-Reg.	6,284	9,196	337,229	3,912	1.46	54	14
	Total	9,959	12,730	561,348	3,912	1.28	56	14

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943  
ST. JOE OPERATION

State	Working	Number of Acres Worked													
		By Forest Service				By Bureau of Entomology and Plant Quarantine				Total					
		Natl. For.	Pub. Dom.	Private	Total	Natl. For.	State	Private	Total	Natl. For.	Pub. Dom.	Total	State	Private	Total
Idaho	First					80	905	985					80	905	985
	Second	1,101	270	252	1,623	645	583	1,417	2,645	1,746	270	2,016	583	1,669	2,252
	Third	2,622	837	1,202	4,661	45			45	2,667	837	3,504		1,202	1,202
	Total	3,723	1,107	1,454	6,284	690	663	2,322	3,675	4,413	1,107	5,520	663	3,776	4,439

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1943  
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes by Species				Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inermis	
First	Cutover (Prior 1940)	985	89,774	48,680	126		138,580
Second	Cutover (Prior 1940)	2,661	53,302	33,621	69		86,992
	Reproduction	759	25,755	3,113		4,038	32,906
	Pole	868	3,889	16,335			20,224
	All Types	4,268	82,946	53,069	69	4,038	140,122
Third	Cutover (Prior 1940)	45	384	111			495
	Reproduction	2,064	62,117	101,298	62		163,477
	Pole	2,102	37,733	3,829		75	41,637
	All Upland	4,211	100,234	105,238	62	75	205,609
	Stream	495	62,055	17	14,582	383	77,037
All Workings	All Types	4,706	162,289	105,255	14,644	458	282,646
	Cutover (Prior 1940)	3,681	143,460	82,412	195		226,067
	Reproduction	2,823	87,872	104,411	62	4,038	196,383
	Pole	2,960	41,622	20,164		75	61,861
	All Upland	9,464	272,954	206,987	257	4,113	484,311
All Workings	Stream	495	62,055	17	14,582	383	77,037
	All Types	9,959	335,009	207,004	14,839	4,496	561,348



SUMMARY OF RIBES ERADICATION, 1929-1943  
ST. JOE OPERATION

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Cutover (1940-1943)		211	54	265	189	14,002	
Cutover (Prior 1940)	1,994	5,333	275	7,602	7,764	730,026	
Burn (Prior 1940)		20		20	42	377	
Reproduction	217,890	78,446	11,210	307,546	352,453	90,898,319	
Pole	86,838	35,001	4,287	126,126	56,229	9,140,579	
Mature	192,059	10,797	170	203,026	87,223	22,823,872	
Brush	2,452	431		2,883	1,924	679,187	
Subalpine	200			200	416	90,809	
All Upland	501,433	130,239	15,996	647,668	506,230	124,377,171	
Stream (Hand)	34,678	12,611	6,866	54,155	99,021	27,406,624	
Stream (Chemical)	7,404	3,245	1,025	11,674	27,212	2,401,836	800,612
Stream (Mechanical)	791	27		818	10,420	409,100	
All Stream	35,469	12,638	6,866	54,973	136,653	30,217,560	
All Types	536,902	142,877	22,862	702,641	642,883	154,594,731	

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man- Days	Ribes	Gallons Spray
Cutover (Prior 1940)	1,994	1,416	238,912		.71	120	
Reproduction	217,890	242,526	81,205,877		1.11	373	
Pole	86,838	33,082	7,780,055		.38	90	
Mature	192,059	78,643	21,688,812		.41	113	
Brush	2,452	1,881	676,620		.77	276	
Subalpine	200	416	90,809		2.08	454	
All Upland	501,433	357,964	111,681,085		.71	223	
Stream (Hand)	34,678	65,337	20,953,990		1.88	604	
Stream (Chemical)	7,404	21,683	2,009,118	669,706	2.93	271	90
Stream (Mechanical)	791	10,101	395,600		12.77	500	
All Stream	35,469	97,121	23,358,708		2.74	659	
All Types	536,902	455,085	135,039,793		.85	252	

TABLE 7B - SECOND WORKING

Cutover (1940-1943)	211	147	6,191		.70	29	
Cutover (Prior 1940)	5,333	5,758	429,158		1.08	90	
Burn (Prior 1940)	20	42	377		2.10	19	
Reproduction	78,446	92,265	9,065,885		1.18	116	
Pole	35,001	20,545	1,290,530		.59	37	
Mature	10,797	8,255	1,097,018		.76	102	
Brush	431	43	2,567		.10	6	
All Upland	130,239	127,055	11,891,726		.98	91	
Stream (Hand)	12,611	22,484	4,843,003		1.78	394	
Stream (Chemical)	3,245	4,731	334,989	111,663	1.46	103	34
Stream (Mechanical)	27	319	13,500		11.81	500	
All Stream	12,638	27,514	5,191,492		2.18	411	
All Types	142,877	154,569	17,083,218		1.08	120	

TABLE 7C - THIRD WORKING

Cutover (1940-1943)	54	42	7,811		.78	145	
Cutover (Prior 1940)	275	580	61,956		2.11	225	
Reproduction	11,210	17,662	626,557		1.58	56	
Pole	4,287	2,602	69,994		.61	16	
Mature	170	325	38,042		1.91	224	
All Upland	15,996	21,211	804,360		1.33	50	
Stream (Hand)	6,866	11,220	1,609,631		1.63	234	
Stream (Chemical)	1,025	798	57,729	19,243	.78	56	19
All Stream	6,866	12,018	1,667,360		1.75	243	
All Types	22,862	33,229	2,471,720		1.45	108	



TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1943  
ST. JOE OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man-Days	Ribes	Gallons Per Sprayed Area
First	Eq-Coop.	18,058	14,246	4,002,581	56,611	.79	222	41
	Eq-Emerg.	189,429	118,249	37,196,488	63,506	.62	196	101
	FS-Reg.	86,539	90,374	26,041,309	262,145	1.04	301	95
	FS-Emerg.	70,981	45,138	15,333,106	101,476	.64	216	129
	CCC	171,895	187,078	52,466,309	185,968	1.09	305	101
	Total	556,902	455,085	135,039,793	669,706	.85	252	90
Second	Eq-Coop.	11,974	9,263	447,029	2,674	.77	37	11
	Eq-Emerg.	42,097	36,727	5,940,959	10,557	.87	141	32
	FS-Reg.	71,058	75,427	6,923,254	40,191	1.06	97	25
	CCC	17,748	33,152	3,771,976	58,241	1.87	213	55
	Total	142,877	154,569	17,083,218	111,663	1.08	120	34
Third	Eq-Coop.	45	41	495		.91	11	
	Eq-Emerg.	2,993	2,922	455,940	3,025	.98	152	12
	FS-Reg.	17,225	25,151	1,363,267	11,721	1.46	79	17
	CCC	2,599	5,115	652,018	4,497	1.97	251	46
	Total	22,862	33,229	2,471,720	19,243	1.45	108	19
All Workings	Eq-Coop.	30,077	23,550	4,450,105	59,285	.78	148	36
	Eq-Emerg.	234,519	157,898	43,593,387	77,088	.67	186	64
	FS-Reg.	174,822	190,952	34,327,830	314,057	1.09	196	62
	FS-Emerg.	70,981	45,138	15,333,106	101,476	.64	216	129
	CCC	192,242	225,345	56,890,303	248,706	1.17	296	83
	Total	702,641	642,883	154,594,731	800,612	.91	220	69

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1943  
ST. JOE OPERATION

Working	Number of Acres Worked						
	Federal			Other			Total
	National Forest	Public Domain	Total	State	Private	Total	
First	216,208	12,578	228,786	67,162	240,954	308,116	536,902
Second	76,461	5,159	81,620	17,277	43,980	61,257	142,877
Third	12,401	1,027	13,428	1,615	7,819	9,434	22,862
Total	305,070	18,764	323,834	86,054	292,753	378,807	702,641

TABLE 10

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1943  
ST. JOE OPERATION

Ownership Class	Number of Acres			Acres on Which Working is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
National Forest	216,208	84,793	300,991	11,089	312,080
Public Domain	12,578	10,847	23,425	1,040	24,465
Subtotal Federal	228,786	95,630	324,416	12,129	336,545
State	67,162	26,973	94,135	20,800	114,935
Private	240,954	135,945	376,899	56,546	433,445
Subtotal Other	308,116	162,918	471,034	77,346	548,380
Total	536,902	258,543	795,450	89,475	884,925



TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1929-1943  
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes leucostre	Ribes viscosissimum	Ribes inermis	Ribes irriguum	Ribes triste	
First	Cutover (Prior 1940)	1,994	154,671	78,805	5,395	41		238,917
	Reproduction	217,890	15,252,226	65,332,727	121,897	344,709	154,313	81,205,897
	Pole	86,838	3,234,919	4,383,484	21,170	53,499	76,983	7,780,055
	Mature	192,059	10,956,325	10,404,806	28,217	42,519	256,945	21,688,812
	Brush	2,452	93,470	579,731	1,997	1,432		676,620
	Subalpine	200	54,975	35,834				90,809
	All Upland	501,433	29,745,886	80,815,397	178,666	482,200	488,246	111,681,085
	Stream	35,463	16,372,394	988,029	3,331,826	2,719,642	16,695	23,358,708
	All Types	536,902	46,118,970	81,703,416	3,510,492	3,201,542	504,941	132,135,039,793
	Cutover (Prior 1940)	211	4,089	2,102				6,191
Second	Burn (Prior 1940)	5,333	180,681	247,507	798	172		429,158
	Reproduction	78,446	3,436,143	5,520,749	35,104	62,311	11,578	9,065,895
	Pole	35,001	559,242	707,943	4,858	18,483	4	1,290,530
	Mature	10,797	487,781	576,618	778	19	31,822	1,097,018
	Brush	431	456	2,111				2,567
	All Upland	130,239	4,668,453	7,087,346	41,538	80,985	43,404	11,891,726
	Stream	12,638	3,045,535	163,110	1,091,834	753,469	6,073,141,471	5,191,432
	All Types	142,877	7,713,988	7,250,456	1,123,372	834,454	49,477,141,471	17,083,218
	Cutover (Prior 1940)	54	6,219	1,592				7,811
	Reproduction	275	15,727	43,408	2,821			61,956
Third	Pole	11,210	259,975	353,077	6,421	7,084		626,557
	Mature	4,287	49,625	20,183	42	144		69,994
	All Upland	170	32,990	3,316	81	1,728		38,042
	Stream	15,996	364,536	421,576	6,471	10,049	1,728	804,350
	All Types	6,856	787,480	23,044	483,945	370,509	2,382	1,667,350
	Cutover (Prior 1940)	22,852	1,152,016	444,620	490,416	380,558	1,728	2,471,720
	Reproduction	265	10,308	3,694				14,002
	Pole	7,602	351,079	369,720	6,193	3,034		730,026
	Mature	20	61	316				377
	All Upland	307,546	18,948,344	71,206,553	163,422	414,104	165,896	90,998,319
All Workings	Stream	126,126	3,843,786	5,111,610	28,070	82,126	76,987	9,140,579
	All Types	203,026	11,477,096	10,984,740	29,003	42,538	290,495	22,823,872
	Brush	2,883	93,926	581,842	1,997	1,432		679,187
	Subalpine	200	54,975	35,834				90,809
	All Upland	547,568	34,779,575	88,294,509	228,875	543,234	553,378	124,377,171
	Stream	54,975	20,205,399	1,074,183	4,897,605	3,873,620	22,768,143,986	30,217,560
	All Types	702,641	54,984,974	89,368,692	5,124,280	4,416,854	556,146	143,985,154,594,731





## BLISTER RUST CONTROL WORK, COEUR D'ALENE OPERATION, 1943

By

M. C. Riley, Technical Supervisor

A. W. Greeley, Assistant Forest Supervisor, U. S. Forest Service

C. J. Pederson, Unit Supervisor, U. S. Forest Service

### INTRODUCTION

The blister rust control program on the Coeur d'Alene National Forest during the 1943 field season consisted of a total of six camps financed by regular Forest Service appropriations and two groups of Italian war internees engaged on ribes eradication for about one month.

The season was characterized by an extreme dearth of experienced workers. Of the six men used as camp foremen only three had previous blister rust experience and none had been camp foremen before. Only eight experienced ribes eradicators were available. Four of these were used as checkers, only one of whom proved entirely satisfactory. Other factors which handicapped the orderly progress of the field season included the mandatory release of all employees under 16 years of age at the end of June after they had all been given training in the work, and the transferring of the better workers from a majority of the camps to fire protection positions.

Because of inclement weather at the start of the season and the early loss of all workers so they could return to school, the average season of ribes eradication work was only approximately two months.

### ORGANIZATION AND ADMINISTRATION

The first camp was established on May 14 and was used as a foreman training camp until it was occupied by eradication crews on May 17. The last camp was established on June 14. Because of the labor shortage and the inadvisability of continuing work on the Grizzly Creek area, that camp was closed on July 30. All camps were closed by September 1. Fifteen Italian war internees from Potter Creek were engaged on ribes eradication for about one month during the latter part of July and the first part of August and another group averaging 15 in number from the Steamboat Camp was used during August.

The Forest Service was responsible for the administration and maintenance of the camps, and technical supervision was provided by the Bureau of Entomology and Plant Quarantine. The field organization was as follows:

#### Bureau of Entomology and Plant Quarantine

M. C. Riley, Technical Supervisor

#### U. S. Forest Service

A. W. Greeley, Forest Officer  
C. J. Pederson, Unit Supervisor

The total number of workers was 228.

## LOCATION AND DESCRIPTION OF AREAS

Ribes eradication efforts were confined to plantations, sanitation areas and stands of natural reproduction. The Hudlow camp performed rework in stream type on Burnt Cabin Creek from its mouth to the mouth of Lone Cabin Creek and reworked George Creek and the next tributary of Burnt Cabin northeast of George Creek. This portion of the worked area lies in sections 8, 17, 18, 20, T. 51 N., R. 1 W. This crew also reworked nearly all of the controlled-burn plantation area on Solitaire Creek in sections 9, 16, 17, T. 52 N., R. 1 W. The Trail Creek camp did first working and rework on Hamilton Creek and first working on Coon Gulch in sections 15, 16, 22, T. 52 N., R. 1 E. Both of these areas support very good stands of natural reproduction. The Drexall Springs camp was engaged entirely on rework in natural reproduction at the head of Squeak Creek and in a 1941 white pine plantation at the head of a fork of Brett Creek. This work was in sections 11, 14, 15, 22, 23, T. 52 N., R. 2 E. The camp at Alden Creek did rework in a very fine 1922 plantation in sections 3, 4, 5, 8, 9, 10, T. 53 N., R. 3 E. The 60-man camp located at Big Creek did initial work in an excellent 30-year old plantation on the Middle Fork of Lost Creek in sections 34, 35, 36, T. 51 N., R. 4 E; first and second working in natural reproduction adjacent to 1942 work in sections 22 and 23, T. 51 N., R. 4 E; and rework on a 1941 plantation on Flat Creek in sections 5, 6, 7, 8, T. 51 N., R. 3 E. The Grizzly camp worked in natural reproduction in sections 16 and 21, T. 50 N., R. 3 E., but because of extremely difficult working conditions, heavy infection and a shortage of labor this camp was discontinued at the end of July. The Italian war internees from Potter Creek did initial stream type work on Trail Creek in section 28, T. 52 N., R. 1 E., and removed 31,913 ribes from 34 acres in 222 effective man-days. The internees from the Steamboat camp worked in stream type and cutover areas near the mouth of Bumblebee Creek in section 35, T. 50 N., R. 1 E., covering a total of 134 acres in 203 effective man-days and destroying 1,355 ribes.

The upland areas in the plantations on Brett, Alden, Flat, the Middle Fork of Lost Creek and the natural reproduction in Hamilton Creek and Coon Gulch represented comparatively easy working conditions. Stream type on all areas and natural reproduction on Grizzly and Lost Creeks presented severe working conditions while the remainder of the areas were about average. Dwarf bushes and an apparently prolonged germination period for ribes seedlings present problems on some of the areas which are reproducing to white pine following logging.

All areas worked are in Federal ownership.

## METHODS AND EQUIPMENT

Due to inexperienced labor and turnover there was a decided lack of qualified straw bosses and crew leaders so that a continual training program was in progress. The method of a crew leader working behind each crew with a group of crews in adjacent lanes was used whenever possible and proved the most satisfactory under existing labor conditions. In all cases the string lines were laid in advance and the improved ribes tool was used by all crew members. The Sheely hook was used considerably, especially by crew leaders and has a

very definite use on rework areas or where the bushes are small. All workers were given training in the proper use of common woods tools before any ribes eradication work was done and a direct benefit was derived from both the safety and efficiency angles.

Within the first day or two after a worker arrived in camp he was interviewed by the camp foreman. The object was to get ideas as to the worker's background and experience as an aid in fitting the level of training to the needs of the individual. Much valuable information was gathered by the foreman which aided materially in his handling of individuals. In addition, the natural reserve automatically set up within himself by the young, inexperienced worker going into a new environment was broken down and this resulted in a much better morale since the worker felt that the foreman had a personal interest in his progress. So much was gained by all concerned that it is planned to adopt the system permanently.

### CONTROL STATUS

During the period 1927 to 1943 there has been a total of 397,253 acres covered on the Coeur d'Alene operation. This consists of 336,209 acres of first working, 50,452 of second working and 10,572 of third working. Although the entire program of ribes eradication, post checking and disease survey work is considerably behind schedule for the normal, orderly progress of the work in order to obtain the best results, it is felt that satisfactory progress is being made considering the size of program allotted.

The North Fork of the Coeur d'Alene River area presents the greatest problems. Blister rust infection is probably more severe here than on any other area of comparable size on the forest, especially near the mouths of Canyon and Cascade Creeks, portions of Burnt Cabin Creek and Barney Creek. Many of the cutover areas are not reproducing to white pine even after stand improvement work has been done, and in some cases white pine has been planted without proper regard for the blister rust protection problems involved. On the other hand there are natural reproduction and pole areas as well as plantations where the status of control work is such that from now on only nominal protection costs are necessary. Areas in this category would include Deception Creek, portions of Burnt Cabin Creek, Lewelling Creek, Tom Lavin Creek, Hudlow and a large part of the Solitaire and Honey Creek burns.

The old burn area around Magee Ranger Station and north to the forest boundary is generally in a good status. A considerable portion of this area is not producing white pine naturally but there are some excellent plantations. The natural white pine reproduction in Trail Creek and its tributaries is practically free from blister rust except for one small draw opposite Callis Creek and a portion is approaching a maintenance standard. Natural reproduction in upper Independence Creek is heavily infected and because of this and the high fire hazard and difficult working conditions, no control work is contemplated here. No appreciable amount of loss from blister rust has occurred in any of the plantations but there is enough infection there now so that a rapid build-up can be expected in 1944 unless proposed work is accomplished.

The pole stands, as exemplified by upper Teepee Creek and Beaver Creek, are in very good condition. Small losses are occurring adjacent to stream type in some places such as Short Creek but about all of the work needed in connection with pole stands is in stream type and small openings.

All of the mature stands have been given what work is feasible until some disturbance occurs except where it might be necessary to work protection strips for younger stands.

What little white pine exists on the north face of the Coeur d'Alene River is badly infected and such areas as Brown, Grizzly, Scott and Lower Steamboat Creeks do not warrant further work.

Generally speaking, the North Fork presents the most serious problems due to infection, cutting and sanitation practices and the uncertainty regarding whether or not cutover areas will reproduce to white pine. In the entire control area there is very little natural reproduction which meets class 1 or class 2 standards. Considerable area has been deferred due to low white pine values and extreme working conditions. A large percentage of the double burns on white pine sites has been planted. While some areas have been lost to blister rust, it is felt that satisfactory results can be obtained with an accelerated program.

#### SURVEYS

Only one experienced checker was available for the 1943 field season. Because of the youth and inexperience of the available material, too much reliance cannot be placed on their efficiency. Other problems affecting the situation are the reluctance of these young, inexperienced workers to assume responsibility, an apparent dislike to working alone and their inability to plan and organize their work. In spite of these handicaps a regular check was run on all eradication areas. The advance surveys necessary for the proper planning and coordination of the work were also completed.

On the Coeur d'Alene National Forest there is an urgent need for a considerable amount of post check work. Due to the pressure of other checking work very little post check was run until after the regular ribes eradication season, which left only a short time when ribes recognition was positive. During the course of the work a total of 72.7 miles of strip was run on post check.

In 1941 a rather ambitious program of pine disease survey work was carried on but none was done in 1942. By 1943 it was possible to note the effect of 1939 and 1941 waves of infection as well as those of earlier origin and consequently all capable personnel available was used on this work after the regular season and as long as weather conditions permitted. The areas chosen for disease survey examination were those of very high priority where previous surveys had shown a start of infection or where no survey information was available. The areas covered do not represent all of those where this type of work is needed but do represent the most urgent situations. A total of 21,925 trees were examined on 35.4 miles of strip. The results of this survey are summarized as follows:



<u>Area</u>	<u>Miles Strip</u>	<u>Trees Examined</u>	<u>Trees Infected</u>	<u>Per Cent Infection</u>
Independence Creek, T. 52, 53 N., R. 2 E. Secs. 4, 5, 8, 32	9.3	5,908	31	.52
Senator Creek, T. 52 N., R. 2, 3 E. Secs. 7, 12, 17, 18	7.8	5,563	153	2.75
Trail Creek, T. 52 N., R. 1 E. Sec. 27	.8	370	57	15.40
Callis Creek, T. 52 N., R. 1 E. Secs. 21, 28	1.8	1,494	33	2.20
Jordan Creek, T. 53 N., R. 3 E. Secs. 15, 22, 23, 25, 26	3.6	3,895	10	.26
East Fork Coeur d'Alene, T. 53 N., R. 3 E. Secs. 17, 20	1.7	1,216	8	.66
Calamity Creek, T. 53 N., R. 3 E. Secs. 16, 17, 20, 21	5.4	3,479	2	.06

On none of the areas listed above, with the exception of Trail Creek, does the per cent of infection appear dangerous but in each case it is an increase of infection and practically all of the cankers are very healthy so that an appreciable build-up can be expected at any time. The infection found in Trail Creek is a small, isolated patch in an area which, since the survey, is not considered for protection because only a small amount of suppressed white pine is present.

Approximately two months were spent on area classification work after the end of the ribes eradication season, this being done in conjunction with the post check and pine disease survey work. The primary objective was to classify the areas considered to have the highest priority since it was realized that the entire control area could not be examined in the one season. In general the area classified includes Burnt Cabin and the remainder of the west side of the North Fork and the east side of the North Fork from Barney Creek to the head; all of the control area which has been worked in Independence Creek as well as the Declaration Creek area; Beaver Creek worked area and adjoining territory; the East Fork of the Coeur d'Alene River except the river face between Beaver Lookout and Deer Creek, and Burnt Creek; Trail and Hamilton Creeks; portions of Upper Teepee; all of the area from Senator Creek practically to Big Creek; portions of Lost Creek; a considerable portion north of the Coeur d'Alene River from Brown Creek to the mouth of the North Fork and other small scattered areas.

Better progress would have been made in this area classification work if those available for the job had been more familiar with the operation as a whole. Due to this lack of an intimate knowledge of the areas, a rather detailed examination was necessary on much of the ground classified. Past silvicultural practices in the North Fork drainage have resulted in such a wide variety of conditions that area classification, as well as blister rust control, is extremely difficult. Generally speaking, there are very few cutover areas here which will reproduce to white pine, regardless of the volume removed, without some form of stand improvement or sanitation. Even when some treatment is given there is no assurance that white pine will come in and on practically all of these areas there is a heavy ribes population.

As a general rule it appears that the best results are obtained when clean burns are followed by planting and on some areas this is the only solution. Even here the problem is not entirely solved because of delayed ribes germination in some instances. So many different silvicultural practices have been followed in the past that each small portion needs close examination before it is possible to determine whether or not it is still a white pine area.

During the course of this area classification it was found that many plantations and natural reproduction stands are in immediate need of attention. In order to protect only the class 1 stands of reproduction size so that appreciable damage from blister rust will not result, the program must be materially increased from that prevailing during the past two seasons.

#### STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

#### EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943 COEUR D'ALENE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 3,781.02
Forest Service	Regular BLR-4	\$87,127.25
Total		\$90,908.27

TABLE 2

#### CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943 COEUR D'ALENE OPERATION

Item	Bureau of Entomology and Plant Quarantine	Forest Service	Total
	Regular BLR-1-4	Regular BLR-4	
Sal. perm. men	\$3,689.21	\$ 8,717.73	\$12,406.94
Sal. temp. men		8,787.60	8,787.60
Wages, temp. labs.		49,855.85	49,855.85
Subs. supplies		15,992.90	15,992.90
Equipment		1,264.44	1,264.44
Travel and transp.	91.81	1,465.70	1,557.51
Twine		172.80	172.80
Other supplies		870.23	870.23
Total	\$3,781.02	\$87,127.25	\$90,908.27

SUMMARY OF RIBES ERADICATION, 1945  
COEUR D'ALENE OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Ribes Remaining	
							Per Acre Bushes	Live Stem
Cutover (Prior 1940)		112	299	411	777	36,641	3.5	8.3
Burn (Prior 1940)		90	184	274	296	23,161	10.8	16.2
Reproduction	1,111	1,118	131	2,360	3,093	116,524	5.5	13.5
Mature		113	74	187	132	5,648	4.2	8.7
Brush		77	13	90	77	13,653	9.4	20.7
All Upland	1,111	1,510	701	3,322	4,375	195,627	5.0	12.9
Stream (Hand)	109	102	85	296	1,577	98,582	14.4	23.7
All Types	1,220	1,612	786	3,568	5,952	294,210	5.3	13.3

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis		Ribes Remaining	
				Man-Days	Ribes	Bushes	Per Acre Live Stem
Reproduction	1,111	1,249	49,995	1.12	45	1.8	9.3
Stream (Hand)	109	1,207	76,724	11.07	704	21.7	41.7
All Types	1,220	2,456	126,719	2.01	104	2.7	11.3

TABLE 3B - SECOND WORKING

Cutover (Prior 1940)	112	137	1,102	1.22	10		
Burn (Prior 1940)	90	29	3,313	.32	37	14.3	28.5
Reproduction	1,118	1,444	60,636	1.29	54	8.5	17.2
Mature	113	45	4,950	.40	44	5.5	11.0
Brush	77	56	12,229	.86	153	9.4	20.7
All Upland	1,510	1,721	82,230	1.14	54	7.8	16.7
Stream (Hand)	102	308	16,064	3.02	157	9.8	9.4
All Types	1,612	2,029	98,294	1.26	61	7.9	16.2

TABLE 3C - THIRD WORKING

Cutover (Prior 1940)	299	640	35,539	2.14	119	3.5	8.3
Burn (Prior 1940)	184	267	19,848	1.45	108	9.1	10.2
Reproduction	131	400	5,893	3.05	45	4.4	17.5
Mature	74	87	693	1.18	9	2.3	5.1
Brush	13	11	1,424	.85	110		
All Upland	701	1,405	63,402	2.00	90	4.2	10.2
Stream (Hand)	85	62	5,725	1.77	166	5.0	9.3
All Types	786	1,467	69,197	1.99	94	4.3	10.1

TABLE 4

TOTAL RIBES BY SPECIES ERADICATED, 1945  
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inermis	
First	Reproduction	1,111	42,983	5,099	1,913	49,995
	Stream (Hand)	109	69,344	134	7,246	76,724
	All Types	1,220	112,327	5,233	9,159	126,719
Second	Cutover (Prior 1940)	112	830	96	176	1,102
	Burn (Prior 1940)	90	459	2,854		3,313
	Reproduction	1,118	51,149	9,076	411	60,636
	Mature	113	4,469	481		4,950
	Brush	77	582	11,647		12,229
	All Upland	1,510	57,489	24,154	587	82,230
	Stream (Hand)	102	15,519	43	402	16,064
Third	All Types	1,612	73,108	24,197	989	98,294
	Cutover (Prior 1940)	299	35,209	2,330		35,539
	Burn (Prior 1940)	184	18,806	1,042		19,848
	Reproduction	131	1,606	4,287		5,893
	Mature	74	493	205		698
	Brush	13	129	1,295		1,424
	All Upland	701	54,243	9,159		63,402
All Workings	Stream (Hand)	85	5,528		207	5,735
	All Types	786	59,821	9,159	207	69,197
	Cutover (Prior 1940)	411	34,039	2,426	176	36,641
	Burn (Prior 1940)	274	19,265	3,896		23,161
	Reproduction	2,360	95,738	18,462	2,324	116,524
	Mature	187	4,952	586		5,648
	Brush	90	711	13,942		13,653
All Upland	All Upland	3,322	154,715	28,412	2,500	195,627
	Stream (Hand)	296	20,551	177	7,853	28,582
	All Types	3,568	175,266	28,589	10,353	294,210





SUMMARY OF RIBES ERADICATION, 1927-1943  
COEUR D'ALENE OPERATION

TABLE 5 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes
Cutover (Prior 1940)	11,914	7,651	4,260	23,825	34,631	6,872,758
Burn (Prior 1940)	5,889	1,251	184	7,324	7,892	1,632,367
Reproduction	84,512	16,718	2,174	103,404	165,291	21,959,308
Pole	66,032	5,801	825	72,658	36,112	5,243,650
Mature	141,857	11,006	1,900	154,763	97,979	15,462,805
Brush	10,555	584	13	11,152	15,794	2,345,681
Subalpine	485			485	283	76,762
Meadow-Field	157			157		
All Upland	321,401	43,011	9,356	373,768	357,982	53,593,331
Stream (Hand)	13,313	4,531	1,216	19,060	60,847	12,412,364
Stream (Mechanical)	1,123	100		1,223	6,830	634,731
Stream (Zone)	372	2,810		3,182	3,825	346,168
All Stream	14,808	7,441	1,216	23,465	71,502	13,393,263
All Types	336,209	50,452	10,572	397,233	429,484	66,986,594

TABLE 5A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis Man-Days	Ribes
Cutover (Prior 1940)	11,914	16,605	4,448,118	1.39	373
Burn (Prior 1940)	5,889	4,555	1,028,668	.77	175
Reproduction	84,512	134,363	19,793,301	1.59	224
Pole	66,032	31,587	4,519,399	.48	68
Mature	141,857	88,242	14,210,671	.62	100
Brush	10,555	14,983	2,234,161	1.42	212
Subalpine	485	283	76,762	.58	158
Meadow-Field	157				
All Upland	321,401	290,618	46,311,080	.90	144
Stream (Hand)	13,313	49,954	11,041,957	3.75	829
Stream (Mechanical)	1,123	5,956	587,434	5.30	523
Stream (Zone)	372	1,315	141,227	3.53	380
All Stream	14,808	57,225	11,770,618	3.86	795
All Types	336,209	347,843	58,081,698	1.03	173

TABLE 5B - SECOND WORKING

Cutover (Prior 1940)	7,651	11,490	1,838,681	1.50	240
Burn (Prior 1940)	1,251	3,070	583,851	2.45	467
Reproduction	16,718	26,877	1,958,253	1.61	117
Pole	5,801	3,781	611,121	.65	105
Mature	11,006	8,701	1,141,546	.79	104
Brush	584	800	110,096	1.37	189
All Upland	43,011	54,719	6,243,548	1.27	145
Stream (Hand)	4,531	9,462	1,289,269	2.09	280
Stream (Mechanical)	100	874	47,294	8.74	473
Stream (Zone)	2,810	2,510	204,941	.89	73
All Stream	7,441	12,846	1,521,504	1.73	204
All Types	50,452	67,565	7,765,052	1.34	154

TABLE 5C - THIRD WORKING

Cutover (Prior 1940)	4,260	6,536	585,959	1.53	138
Burn (Prior 1940)	184	267	19,848	1.45	108
Reproduction	2,174	4,051	207,754	1.86	*96
Pole	825	744	113,150	.90	137
Mature	1,900	1,036	110,588	.55	58
Brush	13	11	1,424	.85	110
All Upland	9,556	12,645	1,038,703	1.35	111
Stream (Hand)	1,216	1,431	101,141	1.18	83
All Types	10,572	14,076	1,139,844	1.33	108



TABLE 6

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1927-1943  
COEUR D'ALENE OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
First	Eq-Reg.	25,776	8,351	2,846,383	.32	110
	Eq-Emerg.	40,997	35,497	6,584,066	.87	161
	FS-Reg.	41,605	47,053	8,929,318	1.13	215
	FS-Emerg.	102,088	78,912	16,462,933	.77	161
	CCC	125,743	178,030	23,258,948	1.42	185
	Total	336,209	547,843	58,081,698	1.03	173
Second	Eq-Emerg.	42	44	5,151	1.05	123
	FS-Reg.	22,827	25,318	4,155,791	1.11	182
	FS-Emerg.	9,136	7,735	1,132,792	.85	124
	CCC	18,447	34,468	2,471,318	1.87	154
	Total	50,452	67,565	7,765,052	1.24	154
Third	FS-Reg.	6,004	6,322	700,253	1.05	117
	FS-Emerg.	487	250	24,398	.51	50
	CCC	4,081	7,504	415,193	1.84	102
	Total	10,572	14,076	1,139,844	1.33	108
All Workings	Eq-Reg.	25,776	8,351	2,846,383	.32	110
	Eq-Emerg.	41,039	35,541	6,589,217	.87	161
	FS-Reg.	70,436	78,693	13,785,362	1.12	196
	FS-Emerg.	111,711	86,897	17,620,173	.78	158
	CCC	148,271	220,002	26,145,459	1.48	176
	Total	397,233	429,484	66,986,594	1.08	169

TABLE 7

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1927-1943  
COEUR D'ALENE OPERATION

Working	Number of Acres Worked				
	Federal		Other		Total
	National Forest	State	Private	Total	
First	315,400	5,659	15,150	20,809	336,209
Second	46,698	530	3,224	3,754	50,452
Third	9,479	200	895	1,093	10,572
All Workings	371,577	6,389	19,267	25,656	397,233

TABLE 8

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1927-1943  
COEUR D'ALENE OPERATION

Ownership Class	Number of Acres			Acres on Which Working Is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
National Forest	315,400	32,302	347,702	10,303	358,025
Public Domain		2,110	2,110		2,110
Subtotal Federal	315,400	34,412	349,812	10,303	360,115
State	5,659	1,171	6,830		6,830
Private	15,150	8,349	23,499	5,151	28,650
Subtotal Other	20,809	9,520	30,329	5,151	35,480
Total	336,209	43,932	380,141	15,454	395,595



TABLE 9

TOTAL RIBES BY SPECIES ERADICATED, 1927-1943  
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Cutover (Prior 1940)	11,914	3,050,950	1,352,046	1	17,536	27,585	4,448,118
	Burn (Prior 1940)	5,889	561,147	448,567		13,530	5,414	1,028,668
	Reproduction	84,512	11,820,946	7,362,253	2,227	506,494	101,381	19,795,301
	Pole	66,032	2,651,127	1,799,863	12,246	12,823	43,540	4,519,399
	Mature	141,857	11,053,700	2,917,046	1	89,402	150,522	14,210,671
	Brush	10,555	778,322	1,424,834		25,748	5,257	2,234,161
	Subalpine	485	55,561	21,201				76,762
	Meadow-Field	157						
	All Upland	321,401	29,971,753	15,325,810	14,475	665,533	333,509	46,311,080
	Stream	14,808	7,251,355	183,261	31,474	4,236,141	68,387	11,770,618
Second	All Types	336,209	37,223,108	15,509,071	45,949	4,901,674	401,896	58,081,698
	Cutover (Prior 1940)	7,651	1,418,565	403,430		13,606	3,080	1,838,681
	Burn (Prior 1940)	1,251	411,432	172,419				583,851
	Reproduction	16,718	1,084,818	851,371		13,229	8,835	1,958,253
	Pole	5,801	477,739	124,199	4,736	3,882	565	611,121
	Mature	11,006	824,104	302,016		11,089	4,327	1,141,546
	Brush	584	12,099	97,997				110,096
	All Upland	43,011	4,228,757	1,951,432	4,736	41,806	16,817	6,243,548
	Stream	7,441	1,061,707	43,758		410,038	6,001	1,521,504
	All Types	50,452	5,290,464	1,995,190	4,736	451,844	22,818	7,765,052
Third	Cutover (Prior 1940)	4,260	504,214	81,745				585,959
	Burn (Prior 1940)	184	18,806	1,042				19,848
	Reproduction	2,174	122,771	73,916		1,067		207,754
	Pole	825	102,407	10,723				113,130
	Mature	1,900	95,813	14,775				110,588
	Brush	13	129	1,295				1,424
	All Upland	9,356	854,140	183,496		1,067		1,038,703
	Stream	1,216	73,144	113		27,884		101,141
	All Types	10,572	927,284	183,609		28,951		1,139,844
	Cutover (Prior 1940)	23,825	4,973,729	1,837,221	1	31,142	30,665	6,872,758
All Workings	Burn (Prior 1940)	7,324	991,385	622,028		13,530	5,424	1,632,367
	Reproduction	103,404	13,028,535	8,287,540	2,227	520,790	110,216	21,959,508
	Pole	72,668	3,221,273	1,934,785	16,932	16,705	43,905	5,243,638
	Mature	154,765	11,973,617	3,233,837	1	100,491	154,859	15,462,805
	Brush	11,152	790,550	1,524,126		25,748	5,257	2,345,681
	Subalpine	485	55,561	21,201				76,762
	Meadow-Field	157						
	All Upland	373,768	35,054,650	17,460,738	19,211	708,406	350,326	53,593,331
	Stream	23,465	8,386,206	227,132	31,474	4,674,063	74,388	13,393,263
	All Types	397,233	43,440,856	17,687,870	50,685	5,382,469	424,714	66,986,594



## BLISTER RUST CONTROL WORK, KANIKSU OPERATION, 1943

By

Harold A. Brischle, Technical Supervisor

The Kaniksu operation is comprised of the valuable stands of white pine pole and reproduction on an area approximately 4,300 square miles in Bonner and Boundary Counties of northern Idaho and Pend Oreille County in eastern Washington. Within this control operation are the lands of the Kaniksu National Forest, the Priest Lake Timber Protective Association, portions of the Pend Oreille Timber Protective Association, state and private lands. The work program consisted of five Forest Service camps varying in size from 25 to 60 men, and two Bureau cooperative camps financed on a cooperative basis between the Federal government, state of Idaho and the Priest Lake Timber Protective Association.

Two groups of Italian war internees were financed from Forest Service regular funds. One group of 25 under the supervision of a Forest Service foreman was a part of a 200-man camp which did other types of forestry work. A group of 38 working under the supervision of a Forest Service camp superintendent was established as an individual camp unit.

### ORGANIZATION AND ADMINISTRATION

Kalispell Bay on Priest Lake served as field headquarters for the Forest Service and Bureau. Subsistence, supplies, equipment and men were dispatched from headquarters to the various camps. Transportation by boat and barge was used whenever possible. Deliveries to isolated camps were made by pack stock. Other camps were serviced by truck.

The field organization was as follows:

#### Bureau of Entomology and Plant Quarantine

H. A. Brischle, Technical Supervisor  
L. J. Easley, Assistant Operation  
Supervisor  
Harry S. Peters, Assistant to Opera-  
tion Supervisor

#### U. S. Forest Service

H. A. Brischle, Technical Supervisor  
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charge of checking

<u>Program</u>	<u>Number Camps</u>	<u>Number Workers</u>	<u>Number Checkers</u>
EQ-Cooperative	2	95	2
FS-Regular	7*	263*	3

Total number of men employed on blister rust control - 373.

\*Includes two groups of Italian war internees totaling 63 men.

The first camp was opened on May 11 and the last one on June 14. Most camps were closed by September 1. Due to the demands of the armed services, war industries, and the urgent need of farm help suitable labor was hard to obtain. The crews were all paid on a monthly basis. When the weather was too



wet for ribes eradication work the crews were used on road and trail maintenance, brush disposal, and other forest improvement work at the discretion of the district ranger. Rainy days were also utilized to a good advantage in training men for fire fighting, smoke chasing, and the proper use of tools.

The regular crews consisted largely of young boys of high school age. Some of these proved too immature for the work. It was found there was a vast difference between handling these young crews in large groups over other years when they worked with older boys and men. Homesickness, playfulness on the job, outright insubordination and outside influence from the parents were the greatest contributing factors for a large turnover in personnel. The boys who stayed through the season demonstrated their ability to perform good and efficient work despite their age and they will be a valuable source for personnel next year.

The supervisory overhead realizing the responsibility of working these young and inexperienced crews exercised care to promote safe methods and working conditions at all times. As a result only one lost-time accident was experienced on the operation during the entire season.

The regular crews covered 9,406 acres at the rate of 1.1 man-days per acre. The Italian internees covered 3,165 acres at the rate of .9 man-days per acre. The internees did a creditable job of ribes eradication. They were willing, conscientious, thorough in their work and proved to be satisfactory in all respects.

#### DESCRIPTION OF AREAS AND LOCATION OF WORK

The Bureau cooperative camps were located on Soldier and Bear Creeks on the Priest Lake Timber Protective Association area. Forest Service camps were located on Kalispell Creek, Kalispell Bay, Beaver Creek, Hellroaring Creek, and the Navigation camp on Upper Priest Lake. One group of Italian war internees worked areas in the vicinity of the Falls Ranger Station. On July 28, personnel in the camp at Navigation was replaced by 38 Italian war internees secured from the U. S. Immigration Service at Missoula, Montana. The internee crews worked on ribes eradication until September 20, after which they worked on canker elimination until late in October. In general, this work consisted of pruning approximately the lower third of the limbs without inspection for cankers. The remaining branches were then inspected and those infected were removed.

Bureau cooperative camps worked in the following townships and sections:

Soldier Creek Drainage - T. 60 N., R. 3 W., secs. 31, 32, 33 34  
T. 60 N., R. 4 W., sec. 36

Bear Creek Drainage - T. 62 N., R. 4 W., secs. 35 and 36  
T. 61 N., R. 4 W., secs. 2, 3, 10, 11, 14

Forest Service camps and Italian war internees did work in the following townships and sections:

Hellroaring Creek Drainage - T. 59 N., R. 2 W., secs. 4, 5, 6  
T. 60 N., R. 2 W., secs. 31, 33

Kalispell Creek Drainage - T. 36 N., R. 45 E., secs. 9, 10, 11, 12, 13, 14,  
15, 16, 19, 21, 22, 23, 24, 25, 26, 27, 28, 33,  
34.

Navigation Camp - (Includes FS-Regular and Italian war internees)  
T. 63 N., R. 4 W., secs. 19, 30, 31, 32  
T. 63 N., R. 5 W., secs. 24, 25

Diamond Peak Area - (Italian war internees)  
T. 36 N., R. 45 E., secs. 9, 10, 11, 12

Lamb Creek Area - T. 35 N., R. 45 E., secs. 1, 2, 3, 11, 12  
T. 36 N., R. 45 E., secs. 26, 34, 35, 36

Reynolds Creek (stream only) - T. 60 N., R. 5 W., secs. 12, 13

Beaver Creek Drainage - T. 62 N., R. 4 W., secs. 6, 7  
T. 61 N., R. 5 W., secs. 1, 11, 12, 13, 14

Falls Ranger Station Area - (Italian war internees)  
T. 58 N., R. 5 W., secs. 16, 17, 20, 21, 33, 34  
T. 57 N., R. 5 W., secs. 4, 5, 6, 7, 8, 9, 13,  
15, 16, 17  
T. 32 N., R. 45 E., secs. 7, 19

All eradication work done was in stands of reproduction, pole, planted areas and streams adjacent to these stands. Difficult working conditions were experienced on several of the areas. In Beaver and Hellroaring Creeks ribes were both large and numerous. The terrain was steep and rugged and in general presented heavy working conditions. The Soldier Creek area was largely in third working. Ribes were numerous but small while the terrain was steep and rugged. Due to the small ribes it was hard to get the area worked to acceptable standards.

A small crew of 25 men working out of blister rust headquarters at Kalispell Bay worked out small scattered areas in the Lamb Creek drainage and in the vicinity of Gleason Mountain. This camp proved quite successful and was operated at an economical cost in connection with regular headquarters camp, cook and other facilities normally used only by a few headquarters personnel.

Work in the Kalispell Creek drainage was confined mostly to planted areas. Several small areas of first working in extremely heavy concentrations of ribes were worked in order to prevent the spread of the rust into the plantations.

## METHODS AND EQUIPMENT

In general, standard methods were used. All older experienced men available and capable of supervising were used to help train the young and inexperienced crews. Italian crews were given a short story of blister rust and the objectives of the control work which was translated from English into Italian. Additional training was carried on by the foreman or camp superintendent through an interpreter. These men were all serious about the work and willing to cooperate. Training them for blister rust work did not present as much of a problem as was anticipated.

The loss of all of our experienced checkers to the armed forces was keenly felt on the operation. Men of suitable age, experience and background for checking were not available for replacements, and it was necessary to train several boys for checking who had only a year of eradication work. These boys were picked because of their ability to find ribes and in this respect they were as capable as most of our checkers in years past. Due to lack of experience they were not able to organize their work or prepare maps as well as checkers in the past, nor were they able to interpret to the camp boss the significance of some of their results. These deficiencies were partially offset by working them in groups under the direct supervision of the checker foreman who assisted with all the preparations of maps and compilation of data.

While the performance of these boys can in no way be compared to that of our checkers of other years they did gain one of the main objectives in that they were able to designate areas needing rework that would have otherwise been overlooked. A number of test check strips were run by the checker foreman and unit supervisor and in all cases the accuracy of the field work was substantiated.

## CONTROL STATUS

Many mature areas of white pine on the operation have been logged in the past five years, thus changing the control status. Due to the lack of qualified checkers the field work necessary to bring these areas into the proper control status has not been done. It is estimated that of a total of 466,879 acres initially worked approximately 40 per cent or 186,750 acres are on a maintenance basis. It is further estimated 100,000 acres are in need of rework and 180,129 acres are up for post check.

The year 1941 seems to have been a very favorable year for the spread of the rust. Probably one of the big factors for this large spread was the wet foggy weather with favorable wind and temperature occurring late that summer and fall.

Several instances of relatively long spreads of rust from ribes to pine were observed. Notable among these was the spread of over a mile in distance from the Diamond Peak area to the Kalispell Creek Plantation. This heavy ribes concentration on Diamond Peak was removed this past season. It was left originally because of the heavy working conditions and expense that would be involved in eradication work. It was thought at that time the protection

strip surrounding the plantation was sufficient to keep the rust from spreading to the planted area. This patch of ribes, about forty acres in size, became heavily infected and in the past several years the production of telia has reached a tremendous volume. Due to the bareness of the plantation there are very few obstacles such as snags, brush and other tree species to shield and screen the planted white pine. Air currents and whirlwinds pass rapidly over the area. It is the opinion that in this instance the distance of spread is not governed alone by mere distance but by the rapidity with which air currents pass over the area.

#### CHECKING, PINE DISEASE SURVEY, AND CLASSIFICATION

Five men were used for checking on the operation at a checking cost of \$0.155 per acre. Of the 12,571 acres worked only 288 acres were left unchecked. The check on the entire area, on which the eradication consisted of initial, second and third working, reveals six ribes and eight feet of live stem remaining per acre. Ninety-two per cent of the area checked was well within the acceptable checking standard. The remaining eight per cent contains live stem from 25 to 50 feet per acre.

A party of six men conducted a pine disease survey from September 4 to November 1. Seven main drainages were surveyed and 6,816 acres covered at a survey cost of \$0.122 per acre. Thirty-three miles of survey strip were run.

All of the survey was made on stands of white pine reproduction and plantations. At the present time these stands are carrying from 300 to 2,400 trees per acre. The surveys undertaken were on areas worked in 1934, 1936, 1939 and 1941. They were worked by the CCC, ERA, EQ-Coop., and regular Forest Service employees. Thereby a cosmopolitan picture may be shown with correlated data for the last decade on the Kaniksu operation.

#### 1943 Survey

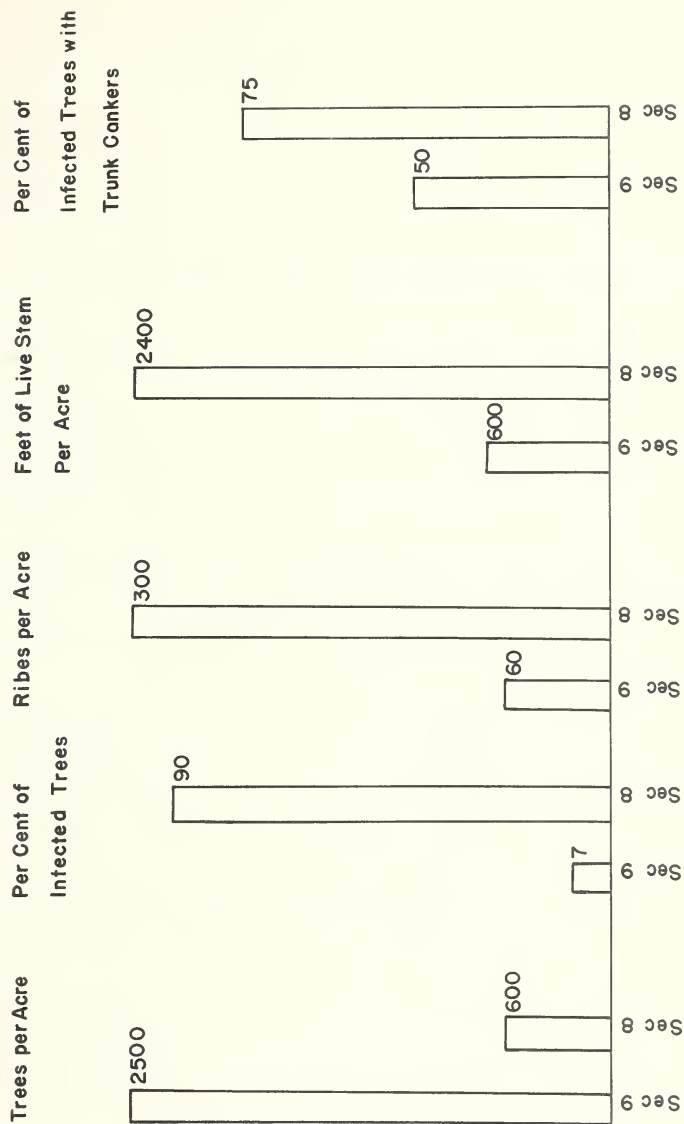
Number of trees examined	18,681
Number of trees infected	2,498
Per cent of trees infected	13

It is noted there is a general increase in the spread of infection during the past seven years particularly on 1940 and 1941 wood. Sixty per cent of the infection found was located on the limbs of the pines. The increase in the spread of the infection is 12.3 per cent. On the other hand it must be noted there is considerable increase in white pine reproduction on these areas over the same period of time. The increase amounts to 128 trees per acre or a gain of 52 per cent.

One area in particular is listed for its striking comparison. It is the LaClere Creek road area located in T. 36 N., R. 45 E., sections 8 and 9. Both areas are adjacent to each other and are identical as to slope, ridge and timber type. Section 9 was worked in 1934. Section 8 has never had any eradication work. The following graph shows the comparison.

The summaries of the survey results in other drainages are listed in another section.









Big Creek Drainage - T. 57 N., R. 3, 4 W. Sections 1, 2, 5, 6, 12.

Chains of survey strip	330
Number of trees examined	2,000
Number of trees infected	507
Per cent of trees infected	25
Number of trees per acre	303
Per cent of infected trees with trunk cankers	67

Effects of pruning enter into this data. Survey shows 51 ribes with 138 feet of live stem per acre. Majority of cankers were found on 1939, 1940 and 1941 wood.

Tillicum Creek Drainage - T. 37 N., R. 45 E. Sections 2, 3, 4, 10.

Chains of survey strip	420
Number of trees examined	2,360
Number of trees infected	314
Per cent of trees infected	13
Number of trees per acre	1,405
Per cent of infected trees with trunk cankers	27

The 1943 survey was taken in late October and too late for accurate ribes data. The majority of the infection was on 1939, 1940 and 1941 wood.

Quartz Creek Drainage - T. 58 N., R. 5 W. Sections 36, 30, 29, 20, 19, 27,  
35, 34, 26.  
T. 57 N., R. 5 W. Sections 1, 2, 24.

Chains of survey strip	1,438
Number of trees examined	7,212
Number of trees infected	1,090
Per cent of trees infected	15
Number of trees per acre	251
Per cent of infected trees with trunk cankers	40

The 1943 survey shows 17 ribes with 435 feet of live stem remaining per acre. The majority of the cankers were on 1939, 1940 and 1941 wood.

Reynolds Creek Drainage - T. 60 N., R. 5 W. Sections 12 and 13

Chains of survey strip	40
Number of trees examined	160
Number of trees infected	4
Per cent of trees infected	3
Number of trees per acre	700
Per cent of infected trees with trunk cankers	25

Three of the infected trees were found adjacent to the stream. No ribes were found on the upland and none on the stream. The stream was worked in 1943.

LaClerc Creek Road Area - T. 36 N., R. 45 E. Section 9

Chains of survey strip	110
Number of trees examined	5,352
Number of trees infected	348
Per cent of trees infected	7
Number of trees per acre	2,171
Per cent of infected trees with trunk cankers	35

The 1943 survey shows 72 ribs with 604 feet of live stem remaining per acre. The majority of the cankers were on 1939, 1940 and 1941 wood. The majority of the trunk cankers were found on 1935 and 1937 wood.

Zero Creek Drainage - T. 62 N., R. 5 W. Sections 7, 8 and 17.

Chains of survey strip	260
Number of trees examined	1,597
Number of trees infected	236
Per cent of trees infected	15
Number of trees per acre	305
Per cent of infected trees with trunk cankers	65

The 1943 survey shows 9 ribs with 73 feet of live stem remaining per acre. The majority of the cankers were on 1939, 1940 and 1941 wood. The majority of the trunk cankers were on 1935 wood.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperating agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943  
KANIKSU OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 5,408.75
	Regular BLR-3-4	31,008.76
	Subtotal	\$ 36,417.51
State of Idaho and Priest Lake Timber Protective Assn.	State and Private BLR-3-4	\$ 4,418.75
Forest Service	Regular BLR-4	\$102,808.34
Total		\$143,644.60

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943  
KANIKSU OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$3,811.89			\$ 3,811.89	\$ 7,797.18	\$ 11,609.07
Sal. temp. men	429.20	\$ 6,327.36	\$1,173.86	7,930.42	12,777.74	20,708.16
Wages, temp. labs.		19,020.51	2,492.37	21,512.88	63,708.78	85,221.66
Subs. supplies	65.89	4,682.19	752.52	5,500.60	11,773.87	17,279.47
Equipment	105.67	9.95		115.62	2,202.62	2,318.24
Trucks					1,321.91	1,321.91
Travel & transp.	487.18	453.88		941.06	1,844.48	2,785.54
Other Supplies	508.92	514.87		1,023.79	1,376.76	2,400.55
Total	\$5,408.75	\$31,008.76	\$4,418.75	\$40,836.26	\$102,808.34	\$143,644.60



SUMMARY OF RIBES ERADICATION, 1943  
KANIKSU OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Cutover (Prior 1940)		1,294		1,294	1,034	93,253	7	13
Reproduction	1,974	5,358	1,955	9,287	9,378	882,195	6	5
Pole	250	970		1,220	1,345	22,830	4	6
Mature	158	256		414	219	3,889	2	3
All Upland	2,382	7,878	1,955	12,215	11,976	1,002,167	5	6
Stream (Hand)		108	248	356	512	26,386	2	7
All Types	2,382	7,986	2,203	12,571	12,488	1,028,553	5	6

TABLE 3A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man-Days	Ribes	Bushes	Live Stem
Reproduction	1,974	2,381	322,061	1.21	163	4	12
Pole	250	124	3,557	.50	14	1	2
Mature	158	40	1,568	.25	10	3	6
All Types	2,382	2,545	327,186	1.07	137	4	11

TABLE 3B - SECOND WORKING

Cutover (Prior 1940)	1,294	1,034	93,253	.80	72	7	13
Reproduction	5,358	4,607	375,912	.86	70	5	6
Pole	970	1,221	19,273	1.26	20	5	7
Mature	256	179	2,321	.70	9	1	1
All Upland	7,878	7,041	490,759	.89	62	5	7
Stream (Hand)	108	161	7,471	1.49	69	3	4
All Types	7,986	7,202	498,230	.90	62	5	7

TABLE 3C - THIRD WORKING

Reproduction	1,955	2,390	184,222	1.22	94	8	8
Stream (Hand)	248	351	18,915	1.42	76	2	8
All Types	2,203	2,741	203,137	1.24	92	7	8



TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1943  
KANIKSU OPERATION

State	Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis Man-Days Ribes	Ribes Remaining Per Acre Bushes Live Stem
Idaho	First	FS-Reg.	2,114	2,006	162,970	.95	77
		Ex-Coop.	1,332	1,655	103,846	1.24	78
	Second	FS-Reg.	4,031	3,715	196,650	.92	49
		Ex-Coop.	856	1,309	59,909	1.53	69
	Third	FS-Reg.	228	314	17,792	1.38	78
		Ex-Coop.	856	1,309	59,909	1.53	69
	All Working	FS-Reg.	6,392	6,025	377,413	.93	38
		Ex-Coop.	1,332	1,655	103,846	1.24	78
	Total	FS-Reg.	12,591	12,488	1,028,553	.99	82
		Ex-Coop.	1,332	1,655	103,846	1.24	78
Washington	First	FS-Reg.	2,114	2,006	162,970	.95	77
		Ex-Coop.	1,332	1,655	103,846	1.24	78
	Second	FS-Reg.	4,031	3,715	196,650	.92	49
		Ex-Coop.	856	1,309	59,909	1.53	69
	Third	FS-Reg.	228	314	17,792	1.38	78
		Ex-Coop.	856	1,309	59,909	1.53	69
	All Working	FS-Reg.	6,392	6,025	377,413	.93	38
		Ex-Coop.	1,332	1,655	103,846	1.24	78
	Total	FS-Reg.	12,591	12,488	1,028,553	.99	82
		Ex-Coop.	1,332	1,655	103,846	1.24	78
Idaho and Washington	First	FS-Reg.	2,114	2,006	162,970	.95	77
		Ex-Coop.	1,332	1,655	103,846	1.24	78
	Second	FS-Reg.	4,031	3,715	196,650	.92	49
		Ex-Coop.	856	1,309	59,909	1.53	69
	Third	FS-Reg.	228	314	17,792	1.38	78
		Ex-Coop.	856	1,309	59,909	1.53	69
	All Working	FS-Reg.	6,392	6,025	377,413	.93	38
		Ex-Coop.	1,332	1,655	103,846	1.24	78
	Total	FS-Reg.	12,591	12,488	1,028,553	.99	82
		Ex-Coop.	1,332	1,655	103,846	1.24	78

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943  
KANIKSU OPERATION

State	Working	Number of Acres Worked													
		By Forest Service			By Bureau of Entomology and Plant Quarantine						Total				
		National Forest	Public Domain	State	Private	Total	State	Private	Total	National Forest	Public Domain	State	Private	Total	Total
Idaho	First	1,520	160	40	394	2,114				1,520	160	1,680	40	394	2,114
	Second	3,548		348	158	4,031	690	642	1,332	3,548		3,548	1,038	777	1,815
	Third	84		144	228	856			856	84		84	856	144	1,000
	Total	5,152	160	388	673	6,273	1,546	642	2,188	5,152	160	5,312	1,934	1,815	8,249
	First	268				268				268					268
Washington	Second	2,623				2,623				2,623		2,623			2,623
	Third	1,119				1,119				1,119		1,119			1,119
	Total	4,010				4,010				4,010		4,010			4,010
	First	1,788	160	40	394	2,382				1,788	160	1,948	40	394	2,382
	Second	6,171		348	135	6,554	890	642	1,532	6,171		6,171	1,038	777	7,986
Total	Third	1,203		144	228	1,575			856	1,203		1,203	856	144	1,600
	Total	9,162	160	388	673	10,283	1,546	642	2,188	9,162	160	9,322	1,934	1,815	12,591

TABLE 6

TOTAL RIBES BY SPECIES ERADICATED, 1943  
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustris	Ribes viscosissimum	Ribes inermis	
First	Reproduction	1,874	187,719	152,641	1,701	322,061
	Pole	220	959	2,598		3,557
	Mature	158	1,178	292	98	1,568
	All Types	2,252	189,856	155,531	1,799	327,186
	Cutover (Prior 1940)	1,294	44,783	45,025	3,445	93,253
Second	Reproduction	5,358	129,417	240,514	1,981	371,912
	Pole	370	5,769	12,484		18,253
	Mature	256	2,155	165		2,321
	All Upland	7,978	182,144	303,199	5,426	490,759
	Stream	104	8,353	154		8,507
Third	All Types	7,996	190,096	303,554	5,580	498,230
	Reproduction	1,955	60,340	120,882		181,222
	Stream	248	10,363	45		10,408
	All Types	2,103	70,703	120,927		191,630
	Cutover (Prior 1940)	1,294	44,783	45,025		93,253
All Working	Reproduction	9,687	336,476	554,037	3,682	894,195
	Pole	1,220	7,748	15,082		22,830
	Mature	414	3,333	458	98	3,889
	All Upland	12,215	411,340	584,502	7,222	1,003,137
	Stream	332	11,315	199		11,514
Total	All Types	12,591	423,655	585,012	15,884	1,028,553





SUMMARY OF RIBES ERADICATION 1923-1943  
KANIKSU OPERATION

TABLE 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes
Cutover (Prior 1940)	8,364	5,908	140	14,412	12,261	3,277,344
Burn (Prior 1940)	1,132			1,132	1,354	947,874
Reproduction	165,726	39,106	8,593	213,425	159,105	37,957,213
Pole	122,029	17,426	475	139,930	51,107	6,662,603
Mature	141,815	5,719	105	147,639	33,277	6,112,486
Brush	3,599	688	179	4,466	1,586	367,519
Subalpine	1,933	110		2,043	1,044	169,129
Meadow-Field	71	10		81	1	72
All Upland	444,669	68,967	9,492	523,128	259,735	55,494,240
Stream (Hand)	20,604	5,306	771	26,681	46,319	9,277,883
Stream (Mechanical)	1,606			1,606	12,075	902,076
All Stream	22,210	5,306	771	28,287	58,394	10,179,959
All Types	466,879	74,273	10,263	551,415	318,129	65,674,199

TABLE 7A - FIRST WORKING

Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis Man-Days	Ribes
Cutover (Prior 1940)	8,364	4,712	1,420,271	.56	170
Burn (Prior 1940)	1,132	1,354	947,874	1.20	837
Reproduction	165,726	115,623	31,841,249	.70	192
Pole	122,029	42,516	6,020,274	.35	49
Mature	141,815	30,231	5,775,347	.21	41
Brush	3,599	1,104	336,107	.31	93
Subalpine	1,933	1,019	156,522	.53	81
Meadow-Field	71				
All Upland	444,669	196,559	46,497,644	.44	105
Stream (Hand)	20,604	36,802	8,257,111	1.79	401
Stream (Mechanical)	1,606	12,075	902,076	7.52	562
All Stream	22,210	48,877	9,159,187	2.20	412
All Types	466,879	245,436	55,656,831	.53	119

TABLE 7B - SECOND WORKING

Cutover (Prior 1940)	5,908	7,480	1,842,903	1.27	312
Reproduction	39,106	34,066	5,130,851	.87	131
Pole	17,426	8,405	622,400	.48	36
Mature	5,719	2,971	335,755	.52	59
Brush	688	360	28,386	.52	41
Subalpine	110	25	12,607	.23	115
Meadow-Field	10	1	72	.10	7
All Upland	68,967	53,308	7,972,974	.77	116
Stream (Hand)	5,306	8,595	967,025	1.62	182
All Types	74,273	61,903	8,939,999	.83	120

TABLE 7C - THIRD WORKING

Cutover (Prior 1940)	140	69	14,170	.49	101
Reproduction	8,593	9,416	985,113	1.10	115
Pole	475	186	19,929	.39	42
Mature	105	75	1,384	.71	13
Brush	179	122	3,026	.68	17
All Upland	9,492	9,868	1,023,622	1.04	108
Stream (Hand)	771	922	53,747	1.20	70
All Types	10,263	10,790	1,077,369	1.05	105



TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS 1923-1943  
KANIKSU OPERATION

State	Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis Man-Days	Ribes
Idaho	First	Eq-Reg.	18,796	6,844	1,066,689	.36	57
		Eq-Coop.	111,419	31,454	9,021,759	.28	81
		Eq-Emerg.	80,596	48,602	8,318,777	.60	103
		FS-Reg.	15,106	21,587	3,155,173	1.45	209
		FS-Emerg.	87,988	34,005	8,213,023	.39	94
		CCC	54,556	37,126	6,539,494	.68	121
		Total	368,441	179,618	36,465,915	.49	99
	Second	Eq-Coop.	8,971	7,336	911,681	.82	102
		Eq-Emerg.	14,527	14,806	2,637,391	1.03	184
		FS-Reg.	14,086	8,443	871,155	.59	61
		FS-Emerg.	11,481	4,818	475,451	.43	42
		CCC	7,883	13,352	1,863,541	1.69	236
		Total	56,858	48,755	6,759,009	.86	119
	Third	Eq-Coop.	2,487	2,757	420,615	1.11	169
		Eq-Emerg.	4,108	5,443	377,539	1.52	92
		FS-Reg.	1,724	904	67,402	.52	39
		Total	8,519	9,104	865,156	1.09	104
	All Workings	Eq-Reg.	18,796	6,844	1,066,689	.36	57
		Eq-Coop.	122,877	41,547	10,354,055	.34	84
		Eq-Emerg.	99,041	68,851	11,333,497	.70	114
		FS-Reg.	31,216	30,934	4,093,550	.99	131
		FS-Emerg.	99,269	38,823	8,788,474	.39	89
		CCC	62,419	50,478	8,451,835	.81	125
		Total	433,618	237,477	44,088,080	.55	102
Washington	First	Eq-Emerg.	30,061	17,555	6,539,175	.58	218
		FS-Reg.	14,219	14,129	5,540,841	.99	390
		FS-Emerg.	34,417	12,708	3,859,496	.37	112
		CCC	19,741	21,426	3,254,404	1.09	165
		Total	98,438	65,818	19,192,916	.67	195
	Second	Eq-Emerg.	1,376	1,381	204,383	1.00	149
		FS-Reg.	11,503	6,810	1,589,014	.59	138
		FS-Emerg.	1,949	1,678	154,764	.86	79
		CCC	2,587	3,279	232,829	1.27	90
		Total	17,415	13,148	2,180,990	.75	125
	Third	Eq-Emerg.	192	352	10,513	1.83	55
		FS-Reg.	1,752	1,324	201,700	.76	115
		Total	1,944	1,686	212,213	.87	109
	All Workings	Eq-Emerg.	31,629	19,288	6,754,071	.61	214
		FS-Reg.	27,474	22,273	7,331,555	.91	267
		FS-Emerg.	36,366	14,386	4,013,260	.40	110
		CCC	22,328	24,705	3,487,233	1.11	156
		Total	117,797	80,652	21,586,119	.68	183
Idaho and Washington	First	Eq-Reg.	18,796	6,844	1,066,689	.36	57
		Eq-Coop.	111,419	31,454	9,021,759	.28	81
		Eq-Emerg.	110,657	66,157	14,857,952	.60	134
		FS-Reg.	29,525	25,716	8,696,014	1.22	297
		FS-Emerg.	122,405	46,713	12,171,519	.78	99
		CCC	74,277	58,552	9,842,998	.79	133
		Total	466,879	245,456	55,656,831	.52	119
	Second	Eq-Coop.	8,971	7,336	911,681	.82	102
		Eq-Emerg.	15,713	16,187	2,841,764	1.03	181
		FS-Reg.	25,889	15,253	2,460,169	.59	95
		FS-Emerg.	13,230	6,496	630,215	.49	48
		CCC	10,470	16,631	2,096,170	1.59	200
		Total	74,273	61,903	8,939,999	.83	120
	Third	Eq-Coop.	2,487	2,757	420,615	1.11	169
		Eq-Emerg.	4,300	5,795	387,852	1.35	90
		FS-Reg.	3,476	2,228	268,902	.64	77
		Total	10,263	10,790	1,077,369	1.05	105
	All Workings	Eq-Reg.	18,796	6,844	1,066,689	.36	57
		Eq-Coop.	122,877	41,547	10,354,055	.34	84
		Eq-Emerg.	120,670	88,139	18,087,568	.67	138
		FS-Reg.	58,690	53,207	11,425,085	.91	195
		FS-Emerg.	135,635	55,209	12,801,734	.59	94
		CCC	84,747	75,183	11,359,068	.89	141
		Total	551,415	318,129	65,674,199	.58	119



TABLE 9  
OWNERSHIP OF LAND COVERED ON RIBES ERADICATION 1923-1943  
KANIKSU OPERATION

State	Working	Number of Acres Worked						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Idaho	First	188,346	214	188,560	111,225	68,656	179,881	368,441
	Second	31,008		31,008	16,487	9,363	25,850	56,858
	Third	1,475		1,475	5,732	1,112	6,844	8,319
	Total	220,829	214	221,043	133,444	79,131	212,575	433,618
Washington	First	69,708		69,708	2,080	26,650	28,730	98,438
	Second	16,371		16,371		1,044	1,044	17,415
	Third	1,752		1,752		192	192	1,944
	Total	87,831		87,831	2,080	27,886	29,965	117,797
Idaho and Washington	First	258,054	214	258,268	113,305	95,306	208,611	466,879
	Second	47,379		47,379	16,487	10,407	26,894	74,273
	Third	3,227		3,227	5,732	1,304	7,036	10,263
	Total	308,660	214	308,874	135,524	107,017	242,541	551,415

TABLE 10  
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1943  
KANIKSU OPERATION

State	Ownership Class	Number of Acres			Acres on Which Working Is Deferred	Total Acres White Pine
		Worked	Unworked	Total		
Idaho	National Forest	188,346	40,337	228,683	26,202	254,885
	Public Domain	214	346	560		560
	Subtotal Federal	188,560	40,683	229,243	26,202	255,445
	State	111,225	17,215	128,440	30	128,470
	Private	68,656	43,664	112,320	5,390	117,710
	Subtotal Other	179,881	60,879	240,760	5,420	246,180
Washington	Total	368,441	101,562	470,003	31,622	501,625
	National Forest	69,708	29,602	99,310		99,310
	State	2,080	2,030	4,110		4,110
	Private	26,650	11,575	38,225		38,225
	Subtotal Other	28,730	13,605	42,335		42,335
	Total	98,438	43,207	141,645		141,645
Washington and Idaho	National Forest	258,054	69,979	327,993	26,202	354,195
	Public Domain	214	346	560		560
	Subtotal Federal	258,268	70,285	328,553	26,202	354,755
	State	113,305	19,245	132,550	30	132,580
	Private	95,306	55,229	150,535	5,390	155,925
	Subtotal Other	208,611	74,484	283,095	5,420	288,515
	Total	466,879	144,769	611,648	31,622	643,270





TABLE 11

TOTAL RIBES BY SPECIES ERADICATED, 1923-1943  
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes By Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	Ribes acerifolium	
First	Cutover (Prior 1940)	8,364	558,257	817,010	45,004			1,420,271
	Burn (Prior 1940)	1,132	153,516	790,402	3,956			947,874
	Reproduction	165,726	9,507,659	22,104,541	226,102	2,947		31,841,249
	Pole	122,029	2,984,265	2,901,946	208,435	21,714	3,914	6,020,274
	Mature	141,815	4,004,358	1,614,403	154,559		2,027	5,775,347
	Brush	3,599	68,387	203,158	64,562			336,107
	Subalpine	1,933	116,392	40,111	19			156,522
	Meadow-Field	71						
	All Upland	444,669	17,292,834	28,471,571	702,637	24,661	5,941	46,497,644
	Stream	22,210	4,859,148	425,512	3,854,943		19,584	9,159,187
Second	All Types	466,879	22,151,982	28,897,083	4,557,580	24,661	25,525	55,656,831
	Cutover (Prior 1940)	5,908	570,658	1,258,397	13,848			1,842,903
	Reproduction	39,106	1,481,142	3,618,200	31,509			5,130,851
	Pole	17,426	301,920	309,337	11,143			622,400
	Mature	5,719	171,128	160,753	3,874			335,755
	Brush	688	16,170	11,341	875			28,386
	Subalpine	110	8,585	4,022				12,607
	Meadow-Field	10	72					72
	All Upland	68,967	2,549,675	5,362,050	61,249			7,972,974
	Stream	5,306	511,423	51,021	404,581			967,025
Third	All Types	74,273	3,061,098	5,413,071	465,830			8,939,999
	Cutover (Prior 1940)	140	5,481	3,688	5,001			14,170
	Reproduction	8,593	276,638	706,067	2,408			985,113
	Pole	475	6,278	13,526	125			19,929
	Mature	105	713	671				1,384
	Brush	179	1,109	1,893	24			3,026
	All Upland	9,492	290,219	725,845	7,558			1,023,622
	Stream	771	32,277	4,090	10,380			53,747
	All Types	10,263	322,496	729,935	17,938			1,077,369
	Cutover (Prior 1940)	14,412	1,134,396	2,079,095	63,853			3,277,344
All Working	Burn (Prior 1940)	1,132	153,516	790,402	3,956			947,874
	Reproduction	213,425	11,265,439	26,428,808	260,019	2,947		37,957,213
	Pole	139,930	3,192,463	3,224,809	219,703	21,714	3,914	6,662,603
	Mature	147,639	4,176,199	1,775,827	158,433		2,027	6,112,486
	Brush	4,466	85,666	216,392	65,461			267,519
	Subalpine	2,043	124,977	44,133	19			169,129
	Meadow-Field	81	72					72
	All Upland	523,128	20,132,728	34,559,466	771,444	24,661	5,941	55,494,240
	Stream	28,287	5,409,848	480,623	4,269,904		19,584	10,179,959
	All Types	551,415	25,542,576	35,040,089	5,041,348	24,661	25,525	65,674,199



## BLISTER RUST CONTROL WORK, MONTANA OPERATION, 1943

By

A. S. Skoglund, Technical Supervisor

### INTRODUCTION

Blister rust control activities on the Montana operation were again confined to the Cabinet National Forest.

The personnel of the camps was composed almost entirely of boys 17 years of age and under, who were recruited from fourteen states and the District of Columbia. This nation-wide recruitment was very beneficial to the management and accomplishments of the camps. By and large the boys did satisfactory work and also earned themselves an enviable reputation on the large Buffalo, Wyoming fire. Another innovation was the successful employment of women cooks and flunkies to alleviate the man power shortage.

A total of 3,834 acres was worked in 1943 as compared to 2,540 acres in 1942 by approximately the same number of man-days. This brings the progress on the Montana operation to 128,432 acres worked initially and 13,619 acres re-worked.

### ORGANIZATION AND ADMINISTRATION

Three camps were operated on the Cabinet Forest with a peak employment of 132. Two 17 year old boys were selected and trained to perform all of the checking necessary to satisfactory operation of the camps.

The camps were administered and maintained by the Forest Service and technical supervision was provided by the Bureau of Entomology and Plant Quarantine. The field organization was directed by A. S. Skoglund.

The first camp was established May 12, and all were in operation by June 4. All of the camps were moved to new locations during the summer. Deep snow drifts on the high roads presented difficult installation and supply problems, yet all camps were in operation on schedule. The season was considerably shortened by the dispatch of two-thirds of the crew on August 6 to suppress the Buffalo, Wyoming fire. The first camp was closed on August 7 and the last one on September 8.

### LOCATION AND DESCRIPTION OF AREAS

Work was performed on the Rock, Marten and Trout Creek areas of the Clark Fork River drainage.

The work on Trout Creek completed an area where ribes eradication work was started in 1934 but allowed to elapse until 1941 and 1942. The description of this 1910 burn area is contained in the previous reports. The Trout Creek work was performed in sections 28 and 33 of T. 24 N., R. 33 W.

First working was performed on the South Fork of Marten Creek. This area comprises a 1930 re-burn of a 1910 burn and subsequently was planted in 1931.

This is now a very thrifty plantation that has been supplemented by considerable stocking from natural sources. The area was relatively light in ribes except for one basin containing over 2,000 ribes per acre. Rust conditions are also light although at the confluence of McNeely Creek with the South Fork there was an area with considerable pine infection. This area was subsequently pruned to reduce the amount of aecia production and to salvage as much white pine as possible. The South Fork area work was in sections 1, 2, 10, 11, 12, 14, 15, 16, 21, 22 and 23 of T. 24 N., R. 33 W. A small amount of third working was performed in sections 20, 21 and 22 of T. 25 N., R. 33 W.

The greater part of the work on Rock Creek was confined to the stream type and stream zone areas. This area was logged in 1926 and has had various cedar sales since that time. A fine stand of white pine is now present with a relatively small amount of infection. The stream type working conditions are severe due to the large amount of cedar slash scattered practically over its entire length. Due to the Wyoming fire, one portion of the area was not worked and should receive first priority in 1944. The Rock Creek area work was in sections 3 and 4 of T. 25 N., R. 32 W., sections 2, 3, 4, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27 and 28 of T. 26 N., R. 32 W., and section 33 of T. 27 N., R. 32 W.

#### SURVEYS AND CONTROL STATUS

An intensive check was made of the transplant beds of Savenac Nursery in the fall of 1943. One hundred twenty-eight infected specimens were found in a check of 60,000 samples of 2-2 transplant stock sown in the fall of 1939 and transplanted in the spring of 1942. This represents .213 per cent infection. The pattern obtained by this survey is not of random distribution but similar to the pattern as obtained in seed beds where the per cent of infection varies directly with the distribution and density of the seedlings. It is too soon after the eradication of ribes from Haugan Lookout to determine what effect their removal had on the distribution of infection in the Nursery.

Extensive logging in the Troy unit of the Kootenai National Forest is rapidly changing the cover from one of mature timber and few ribes to that of seedling white pine and varying ribes conditions. The removal of these ribes must be accomplished at a time before any infection has an opportunity to develop. There is no visible infection in the south fork of Keeler Creek, consequently the removal of ribes in the new cuttings may be postponed until the drainage has been logged and necessary sanitation work performed. In the Star Creek area the blister rust program should be coordinated with the management plans for the disposition of the cedar. Rust is gradually but steadily developing in the Spar Lake vicinity which is located near the heavy Ross Creek center and therefore should receive high priority in the planning of the program for next season.

The Bull River unit of the Cabinet Forest contains a large percentage of pole size white pine with varying stages of rust development. The infection in Star Gulch has intensified on the fringes of the control area and in several places has spread somewhat into the stand itself. Blister rust has

been found in Carmichael Gulch and can be expected to intensify if immediate action is not forthcoming.

The Canyon Creek Plantation unit was dropped from the control area because the rust has developed so rapidly and eradication costs would be excessive.

The White Pine Creek area was reduced in size because of insufficient stocking and high costs. The adjusted area contains a thrifty stand of planted white pine supplemented by natural restocking with light ribes and practically no infection. Working of this area may be postponed for several years.

The St. Regis River unit of the Cabinet Forest is both pathologically and ecologically the most difficult unit in the control of blister rust in the state of Montana. Yet, despite this situation, fine stands are developing and should continue to develop if we are cognizant of the situation and adjust the plans accordingly.

Pruning work is recommended for the West Fork of Big Creek due to the mass introduction of rust in 1937 and 1938. Also the protection zone around the Middle Fork plantation area should be extended to prevent the filtering of spores into the plantation from the ribes on the higher slopes.

Of the area worked this past season 1,660 acres are on maintenance, 1,906 acres on post check and 263 acres on rework.

#### STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs by cooperative agency and type of appropriation is shown in the following tabulations:

TABLE 1  
EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943  
MONTANA OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 2,480.46
Forest Service	Regular BLR-4	42,200.99
Total		\$44,681.45

TABLE 2  
CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943  
MONTANA OPERATION

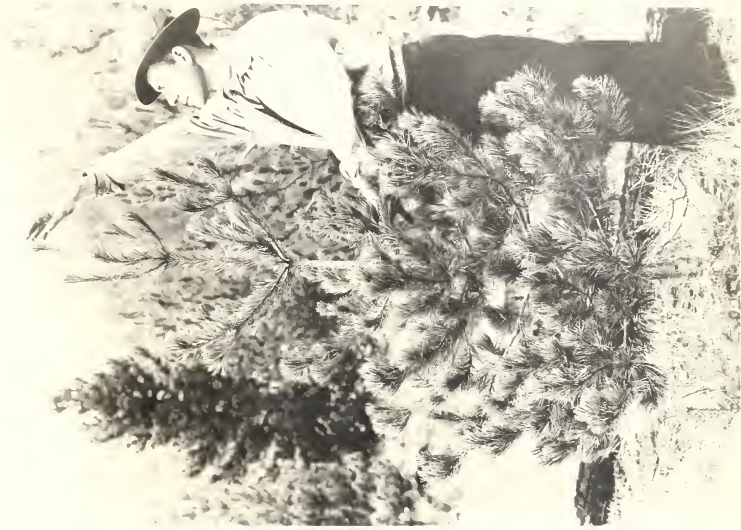
Item	Bureau of Entomology and Plant quarantine	Forest Service	Total
	Regular BLR-1-4	Regular BLR-4	
Sal., perm. men	\$2,249.27	\$ 2,845.10	\$ 5,094.37
Wages, temp. labs.		29,338.71	29,338.71
Subs. supplies		7,301.74	7,301.74
Equipment		1,296.59	1,296.59
Travel and transp.	231.19	639.42	639.42
Other supplies		779.43	1,010.62
Total	\$2,480.46	\$42,200.99	\$44,681.45



Two pictures showing growth on planted white pine pruned to two-fifths height of tree to eliminate damage from blister rust cankers. The plantation was established in 1926.



A-71. Taken 1941, one growing season after pruning.



W-71-1. Taken 1943, three growing seasons after pruning.





SUMMARY OF RIBES ERADICATION, 1943  
MONTANA OPERATION

TABLE 3 - SUMMARY OF ALL WORKINGS

Forest	Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Ribes Remaining Per Acre	
								Bushes	Live Stem
Cabinet	Reproduction	1,471	320	389	2,180	2,998	298,753	1.0	3.1
	Pole	427			427	4			
	Brush	789			789	31	590	1.0	9.0
	All Upland	2,687	320	389	3,396	3,033	299,343	1.0	3.8
	Stream (Hand)	56	382		438	686	40,024		
	All Types	2,743	702	389	3,834	3,719	339,367		

TABLE 3A - FIRST WORKING

Forest	Eradication Type	Acres	Effective Man-Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
					Man-Days	Ribes	Bushes	Live Stem
Cabinet	Reproduction	1,471	2,224	272,860	1.51	185	1.0	3.7
	Pole	427	4		.01			
	Brush	789	31	590	.04	1	1.0	9.0
	All Upland	2,687	2,259	273,450	.84	102	1.0	4.3
	Stream (Hand)	56	100	23,419	1.79	418		
	All Types	2,743	2,359	296,869	.86	108		

TABLE 3B - SECOND WORKING

Cabinet	Reproduction	320	637	21,189	1.99	66	1.0	1.0
	Stream (Hand)	382	586	16,605	1.53	43		
	All Types	702	1,223	37,794	1.74	54		

TABLE 3C - THIRD WORKING

Cabinet	Reproduction	389	137	4,704	.35	12		
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TABLE 4

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1943  
MONTANA OPERATION

Forest	Working	Number of Acres Worked by Forest Service		
		National Forest	Private	Total
Cabinet	First	2,487	256	2,743
	Second	531	171	702
	Third	389		389
	Total	3,407	427	3,834





TABLE 5

TOTAL RIBES BY SPECIES ERADICATED, 1943  
MONTANA OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscoelissimum	Ribes inerme	
First	Reproduction	1,471	204,814	68,046		272,860
	Pole	427				
	Brush	789	210	380		590
	All Upland	2,687	205,024	68,426		273,450
	Stream	56	12,564	55	10,400	23,419
Second	All Types	2,743	217,988	68,481	10,400	296,869
	Reproduction	320	17,165	4,024		21,189
	Stream	382	14,278	1,627		16,605
Third	All Types	702	32,143	5,651		37,794
	Reproduction	389	1,736	2,968		4,704
	Reproduction	2,180	223,715	75,038		298,753
All Workings	Pole	427				
	Brush	789	210	380		590
	All Upland	3,396	223,925	75,418		299,343
	Stream	438	27,942	1,682	10,400	40,024
	All Types	3,834	251,867	77,100	10,400	339,367

SUMMARY OF RIBES ERADICATION, 1928-1943  
MONTANA OPERATION

TABLE 6 - SUMMARY OF ALL WORKINGS

Forest	Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man-Days	Total Ribes	Gallons Spray
Kootenai	Burn (Prior 1940)	115			115	1	32	
	Reproduction	12,504	341		12,845	8,783	1,101,839	
	Pole	18,884	779		19,663	7,830	851,971	
	Mature	16,427			16,427	3,539	481,919	
	Brush	235			235	94	7,956	
	Meadow-Field	103			103	1		
	All Upland	48,268	1,120		49,388	20,248	2,443,717	
	Stream (Hand)	3,050	533		3,583	8,982	1,277,034	
	All Types	51,318	1,653		52,971	29,230	3,720,751	
	Reproduction	29,229	4,990	1,092	35,311	36,524	6,346,969	
Cabinet	Pole	24,061	783	50	24,894	10,001	1,837,428	
	Mature	9,297	12		9,309	4,462	1,065,784	
	Brush	4,270			4,270	2,075	584,273	
	Meadow-Field	348			348	150	12,131	
	All Upland	67,205	5,785	1,142	74,132	53,212	9,846,585	
	Stream (Hand)	3,773	1,385	351	5,509	13,568	3,057,533	
	Stream (Chemical)	465	116	12	593	1,604	108,762	36,254
	Stream (Mechanical)	98			98	859	51,000	
	All Stream	3,871	1,385	351	5,607	16,048	3,217,295	
	All Types	71,076	7,170	1,493	79,739	69,260	13,063,880	
Sevensac Nursery	Reproduction	5,000	179	85	5,264	1,944	559,902	
	Stream (Hand)	1,043	904	2,000	4,027	4,249	730,520	
	Stream (Chemical)	239	62		301	880	200,801	36,262
	Stream (Mechanical)	45	15	40	100	846	45,500	
	All Stream	1,088	999	2,040	4,127	5,975	976,821	
	All Types	6,088	1,178	2,125	9,391	7,919	1,536,723	
	Burn (Prior 1940)	115			115	1	32	
	Reproduction	46,733	5,510	1,177	53,420	47,251	8,008,710	
	Pole	42,945	1,562	50	44,557	17,831	2,689,399	
	Mature	25,724	12		25,736	8,001	1,547,703	
All Forests	Brush	4,505			4,505	2,169	592,229	
	Meadow-Field	451			451	151	12,131	
	All Upland	120,473	7,084	1,227	128,784	75,404	12,850,204	
	Stream (Hand)	7,866	2,902	2,351	13,119	26,816	5,065,087	
	Stream (Chemical)	704	178	12	894	2,484	309,563	72,516
	Stream (Mechanical)	143	15	40	198	1,705	96,500	
	All Stream	8,009	2,917	2,391	13,317	31,005	5,471,150	
	All Types	128,482	10,001	3,618	142,101	106,409	18,321,354	

TABLE 6A - FIRST WORKING

Forest	Eradication Type	Acres	Effective Man-Days	Total Rises	Per Acre Basis		
					Gallons Spray	Man- Days	Gallons Spray
Kootenai	Burn (Prior 1940)	115	1	32		.01	1
	Reproduction	12,504	8,618	1,076,317		.69	86
	Pole	18,884	7,223	811,481		.38	43
	Mature	16,427	3,533	481,919		.22	29
	Brush	235	94	7,956		.40	34
	Meadow-Field	103	1			.01	
	All Upland	49,266	12,476	2,377,705		.40	49
	Stream (Hand)	3,050	1,127	1,214,153		2.69	398
Cabinet	All Types	51,318	27,653	3,591,854		.74	70
	Reproduction	29,229	28,901	5,673,111		.99	191
	Pole	24,051	9,152	1,742,087		.38	72
	Mature	9,227	4,447	1,064,323		.48	114
	Brush	4,270	2,075	594,273		.42	137
	Meadow-Field	348	150	12,131		.43	35
	All Upland	67,205	44,725	8,375,330		.67	134
	Stream (Hand)	3,773	10,823	2,851,458		2.87	756
Sevensac Nursery	Stream (Chemical)	465	1,180	77,079	25,693	2.54	165
	Stream (Mechanical)	26	852	51,000		8.77	520
	All Stream	3,871	12,868	2,379,537		3.32	770
	All Types	71,076	57,593	11,355,467		.81	168
	Reproduction	5,000	1,688	821,650		.34	104
	Stream (Hand)	1,043	1,710	372,268		1.64	357
	Stream (Chemical)	239	777	189,401	32,132	3.25	783
	Stream (Mechanical)	45	168	22,500		3.73	500
All Forests	All Stream	1,038	2,655	583,169		2.44	536
	All Types	6,088	4,343	1,104,819		.71	181
	Burn (Prior 1940)	115	1	32		.01	1
	Reproduction	46,733	39,507	7,171,078		.84	153
	Pole	42,345	16,375	2,553,568		.38	59
	Mature	25,724	7,986	1,546,247		.31	60
	Brush	4,505	2,169	592,229		.48	131
	Meadow-Field	451	151	12,131		.33	27
	All Upland	120,473	65,889	11,875,235		.65	39
	Stream (Hand)	7,856	20,715	4,437,058		2.63	554
	Stream (Chemical)	704	1,957	265,480	57,825	2.78	377
	Stream (Mechanical)	143	1,027	73,500		7.18	514
	All Stream	8,003	23,700	4,775,855		2.95	596
	All Types	128,482	89,582	16,652,150		.70	130

TABLE 6B - SECOND WORKING

Kootenai	Reproduction	341	165	25,522		.48	75
	Pole	779	507	40,430		.78	52
	All Upland	1,121	672	65,952		.69	59
	Stream (Hand)	533	805	62,875		1.51	118
	All Types	1,653	1,577	128,887		.95	78
	Reproduction	4,990	6,717	696,283		1.35	140
	Pole	783	750	89,475		.96	114
	Mature	12	15	1,455		1.25	121
Cabinet	All Upland	5,785	7,482	787,214		1.29	136
	Stream (Hand)	1,385	2,430	168,214		1.75	121
	Stream (Chemical)	116	276	21,048	7,016	2.38	181
	All Stream	1,385	2,706	189,262		1.95	137
	All Types	7,170	10,198	976,476		1.42	135
	Reproduction	172	185	34,173		1.04	191
	Stream (Hand)	984	1,018	294,673		1.03	229
	Stream (Chemical)	62	103	12,400	4,130	1.66	200
Sevensac Nursery	Stream (Mechanical)	15	36	3,000		2.40	200
	All Stream	999	1,157	310,073		1.16	310
	All Types	1,178	1,343	344,246		1.14	232
	Reproduction	5,510	7,068	755,378		1.28	137
	Pole	1,562	1,357	129,365		.87	83
	Mature	32	45	1,455		1.25	121
	All Upland	7,084	8,440	887,329		1.39	125
	Stream (Hand)	2,902	4,253	555,762		1.47	181
All Forests	Stream (Chemical)	178	379	33,448	11,146	2.13	189
	Stream (Mechanical)	15	36	3,000		2.40	200
	All Stream	2,917	4,688	562,210		1.60	193
	All Types	10,601	15,109	1,449,609		1.31	145

TABLE 6C - THIRD WORKING

Cabinet	Reproduction	1,092	906	77,575		.83	71
	Pole	50	92	5,865		1.38	117
	All Upland	1,142	1,005	83,441		.88	73
	Stream (Hand)	351	326	37,861		.93	108
	Stream (Chemical)	12	148	10,635	3,545	12.33	886
	All Stream	351	474	48,496		1.35	138
	All Types	1,493	1,472	131,337		1.91	88
	Reproduction	82	70	4,079		.82	43
Sevensac Nursery	Stream (Hand)	2,000	1,521	63,579		.76	32
	Stream (Mechanical)	40	642	20,000		16.05	500
	All Stream	2,040	2,163	83,579		1.06	41
	All Types	2,122	2,533	87,658		1.05	41
	Reproduction	1,177	976	81,654		.83	69
	Pole	50	92	5,865		1.38	117
	All Upland	1,227	1,075	87,550		.88	71
	Stream (Hand)	2,351	1,547	101,440		7.97	43
All Forests	Stream (Chemical)	12	148	10,635	3,545	12.33	886
	Stream (Mechanical)	40	642	20,000		16.05	500
	All Stream	2,371	2,637	132,075		1.10	55
	All Types	3,618	3,711	219,595		1.08	61



TABLE 7

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1928-1943  
MONTANA OPERATION

Working	Class	Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre Basis		
						Man- Days	Ribes	Gallons Per Sprayed Area
First	EQ-Reg.	1,383	2,315	462,300	30,665	1.67	334	148
	EQ-Emerg.	64,086	28,413	5,450,738	1,330	.44	85	44
	FS-Reg.	15,779	15,690	2,284,611	2,452	.99	145	54
	FS-Emerg.	33,462	33,088	7,157,633	20,598	.99	214	55
	CCC	13,772	10,083	1,296,868	2,780	.73	94	59
	Total	128,482	89,589	16,652,150	57,825	.70	130	82
Second	EQ-Reg.	619	980	299,410	4,130	1.58	484	67
	EQ-Emerg.	1,342	1,597	265,637		1.19	198	
	FS-Reg.	5,262	5,893	517,114	5,976	1.12	98	62
	FS-Emerg.	2,100	2,464	204,021	1,040	1.17	97	52
	CCC	678	2,174	163,427		3.21	241	
	Total	10,001	13,108	1,449,609	11,146	1.31	145	63
Third	EQ-Emerg.	648	777	59,040		1.20	91	
	FS-Reg.	2,795	2,684	142,772		.96	51	
	FS-Emerg.	150	68	6,069		.45	40	
	CCC	25	183	11,714	3,545	7.32	469	295
	Total	3,618	3,712	219,595	3,545	1.03	61	295
All Workings	EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380	129
	EQ-Emerg.	66,076	30,787	5,775,415	1,330	.47	87	44
	FS-Reg.	23,836	24,267	2,944,497	8,428	1.02	124	60
	FS-Emerg.	35,712	35,620	7,367,723	21,638	1.00	206	55
	CCC	14,475	12,440	1,472,009	6,325	.86	102	107
	Total	142,101	106,409	18,321,354	72,516	.75	129	81

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1928-1943  
MONTANA OPERATION

Forest	Working	Number of Acres Worked						
		Federal			Other			Total
		National Forest	Public Domain	Total	State	Private	Total	
Kootenai	First	46,781		46,781		4,537	4,537	51,318
	Second	1,165		1,165		488	488	1,653
	Total	47,946		47,946		5,025	5,025	52,971
Cabinet	First	61,934	40	61,974	734	14,456	15,190	77,164
	Second	6,779		6,779	1	1,568	1,569	8,348
	Third	2,244		2,244		1,374	1,374	3,618
	Total	70,957	40	70,997	735	17,398	18,133	89,130
All Forests	First	108,715	40	108,755	734	18,993	19,727	128,482
	Second	7,944		7,944	1	2,056	2,057	10,001
	Third	2,244		2,244		1,374	1,374	3,618
	Total	118,903	40	118,943	735	22,423	23,158	142,101





TABLE 9  
 PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1928-1943  
 MONTANA OPERATION

Forest	Ownership Class	Number of Acres			Acres on Which Working is Deferred	Total Acres White Pine
		Worked	Unworked	Total		
Kootenai	National Forest	46,731	25,690	72,461	14,434	86,895
	State		234	234		234
	Private	4,537	5,749	10,286	2,490	12,776
	Subtotal Other	4,537	5,933	10,520	2,490	13,010
	Total	51,318	31,663	82,981	16,954	99,905
Cabinet	National Forest	61,934	12,020	73,954	3,034	76,988
	Public Domain		40	40		40
	Subtotal Federal	61,974	12,020	73,994	3,034	77,028
	State		734	734		734
	Private	14,456	8,617	23,073		23,073
All Forests	Subtotal Other	15,190	8,617	23,807		23,807
	Total	77,164	20,637	97,801	3,034	100,835
	National Forest	108,715	37,700	146,415	17,468	163,883
	Public Domain		40	40		40
	Subtotal Federal	108,755	37,700	146,455	17,468	163,923
	State		734	734		734
	Private	18,993	14,366	33,359	2,490	35,849
	Subtotal Other	19,727	14,600	34,327	2,490	36,817
	Total	128,482	52,300	180,782	19,958	200,740

TABLE 10  
 TOTAL RIBES BY SPECIES ERADICATED, 1928-1943  
 MONTANA OPERATION

Working	Eradication Type	Acres	Ribes by Species							Total Ribes
			Ribee lacustre	Ribee viscosissimum	Ribee petiolare	Ribee inermis	Ribee irriguum	Ribee coloradense	Ribee triste	
First	Burn (Prior 1940)	115	32							32
	Reproduction	46,733	3,354,122	3,637,271	4,714	55,569	114,802	3,455	1,145	7,171,078
	Pole	42,945	1,425,435	942,390	200	101,205	84,338			2,553,568
	Mature	25,724	1,341,526	177,396	259	11,080	8,729	7,257		1,546,247
	Brush	4,505	286,619	295,188		5,260	5,162			592,229
	Meadow-Field	451	5,010			7,121				12,131
	All Upland	120,473	6,412,744	5,052,245	5,173	180,235	213,031	10,712	1,145	11,875,235
Second	Stream	8,009	3,033,230	118,153	256,006	1,234,654	5,744	31,905	21,123	4,775,855
	All Types	128,482	9,452,024	5,170,398	271,179	1,474,889	218,775	42,617	22,268	16,652,150
	Reproduction	5,510	446,406	286,787	4,860	4,668	10,666		2,591	755,978
	Pole	1,562	95,222	24,294	119	6,419	921			129,965
	Mature	12	1,456							1,456
	All Upland	7,094	546,084	311,071	4,979	11,087	11,597		2,591	887,399
	Stream	2,917	166,197	4,913	48,208	324,083	10,975		7,834	552,210
Third	All Types	10,001	712,281	315,984	53,187	335,170	22,562		10,425	1,449,609
	Reproduction	1,177	47,600	33,647	93		200		114	81,654
	Pole	50	800	5,050			6			5,866
	All Upland	1,227	49,400	38,707	93		206		114	87,520
	Stream	2,391	17,832	339	35,905	62,257			15,742	132,075
	All Types	3,618	66,232	39,046	35,998	62,257	206		15,856	213,595
	Burn (Prior 1940)	115	32							32
All Workings	Reproduction	53,420	3,848,128	3,957,705	9,667	60,237	125,668	3,455	3,850	8,008,710
	Pole	44,557	1,554,457	971,734	313	107,624	85,265			2,689,399
	Mature	25,736	1,342,932	177,396	259	11,080	8,729	7,257		1,547,703
	Brush	4,505	286,619	295,188		5,260	5,162			592,229
	Meadow-Field	451	5,010			7,121				12,131
	All Upland	128,794	7,007,223	5,402,023	10,245	191,322	224,824	10,712	3,850	12,850,204
	Stream	13,317	3,223,309	123,405	350,119	1,630,994	16,719	31,905	44,699	5,421,150
All Types	142,101	10,230,537	5,525,428	360,364	1,872,316	241,543	42,617	48,549	18,321,354	



BLISTER RUST CONTROL  
MOUNT RAINIER NATIONAL PARK, 1943

By  
M. C. Riley, Technical Supervisor

White pine blister rust control work on Mount Rainier National Park during the 1943 field season was financed with regular funds and was conducted by one crew which consisted of a maximum of 40 men, all of whom were inexperienced in the work. The entire season from June 7 to August 28 was spent working on the Silver Forest portion of the Longmire area. During the month of June less than one half the time of the crew was spent on blister rust control work because of rainy weather. During inclement weather the crew was used on work better suited to the conditions and this aided materially in reducing labor turnover. The work was supervised by an experienced foreman and an assistant.

Ribes eradication consisted entirely of third working and was performed on stream type along the Nisqually River and its tributaries from a point approximately one-half mile above Longmire to the limits of the ribes zone, along Paradise Creek and its tributaries from the mouth to a short distance above Narada Falls and in pole type in the Silver Forest north and east of Canyon Rim. This area lies in unsurveyed sections 15, 22, 23, 28, T. 15 N., R. 8 E. Willamette Meridian. It had been planned that the crew would move to White River during the latter part of the season but the entire season was needed to complete the programmed work at Longmire. This was due in part to slow progress during June because of inclement weather, but principally because more ribes were encountered than had been anticipated. On some of the stream type there was a more serious seedling problem than had been experienced previously and a particularly troublesome patch of ground in the pole type which had been worked under the CCC program delayed completion of the job beyond what had been estimated.

Since work started on these areas in 1930, there has naturally been considerable change in silvicultural and ecological conditions. The natural growth of the trees where the stocking is sufficient tends to close the canopy to such an extent that further ribes germination is retarded and there is relatively little tendency for either an increase or a decrease in the number of bushes present. This condition now prevails on a considerable portion of the Longmire-Silver Forest area and as a result the type designations have been changed from reproduction to pole in the progress tables. This same condition also applies to other areas within the Park; and when the next working is done there, the same changes in type designation will be made.

In addition to the ribes eradication work, canker elimination was performed during the latter part of the field season. First coverage was completed at Longmire, and the Silver Forest was worked from Ricksacker Point to a considerable distance beyond Canyon Rim. Canker elimination was done on 196 acres and required 149 man-days. This resulted in the inspection of 7,795 white pine trees of which 3,151 were infected and from these infected trees 15,102 cankers were removed. It is estimated that less than 10 per cent of this infection originated since second working was completed on the areas.

Infection was found to be heavier in the Silver Forest than at Longmire but the above figures are not necessarily representative of general infection conditions since work was only done where noticeable infection occurred and there is considerable area where there is no blister rust.

No regular strip checks were run on the area worked this year because no checker was available. The foreman and his assistant were able to furnish enough close supervision so that it is felt a satisfactory quality of work was performed.

The ribes eradication accomplished this season did not materially affect the over-all control status figures for the Park since a major portion of the acreage covered was in stream type which will undoubtedly need further working. In the pole type worked this year so many ribes were removed that it is expected another working will be necessary.

A representative of the Bureau of Entomology and Plant Quarantine helped plan, organize and supervise the work. Because of other assignments it was not possible for him to devote as much time as was desired or as had been possible in other years. The Bureau also supplied the necessary forms, maps and supplies for the proper recording and reporting of data.

#### RECOMMENDATIONS

For the 1944 field season a crew of 30 men should be employed. The majority of the time should be spent on the White River area, doing ribes eradication on parts of areas near Sunrise Point which were worked in 1941 and in doing canker elimination work near Shadow Lake, as well as reworking the area from which cankers were removed in 1941. This should result in the removal of practically all of the infection which has developed since the last working. It is likely that, in order to take advantage of labor as soon as schools are closed, it will be necessary to start operations on the Longmire area prior to the time working conditions are favorable at White River.

#### RESULTS

The following tables show statements of expenditures, results of the 1943 field work and accumulative results for all work done to date.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943  
MOUNT RAINIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 451.73
National Park Service	Regular BLR-5	14,937.34
Total		\$15,389.07

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943  
MOUNT RAINIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	Regular BLR-5	
Sal. perm. men	\$370.58		\$ 370.58
Personal services		\$14,681.47	14,681.47
Travel and transp.	81.15		81.15
Contractual services		240.35	240.35
Supplies and material		15.52	15.52
Total	\$451.73	\$14,937.34	\$15,389.07



TABLE 3  
SUMMARY OF RIBES ERADICATION, 1943  
MOUNT RAINIER NATIONAL PARK

Area	Working Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis	
				Ribes lacustre	Ribes bracteosum	Ribes laxiflorum	Ribes acerifolium		Man-Days	Ribes
Longmire	Pole	140	671	4,109	202	21	13,786	18,118	4.79	129
	Stream	235	699	25,617	5,743	1,100	455	32,920	2.45	116
	Total	425	1,370	29,726	5,950	1,121	14,241	51,038	3.22	120

TABLE 4  
SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1930-1943  
MOUNT RAINIER NATIONAL PARK

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
First	NP-Reg.	2,647	3,806	780,171	1.44	295
	NP-CCC	5,607	6,264	860,336	1.12	154
	Total	8,254	10,070	1,640,507	1.22	199
Second	NP-Reg.	766	569	19,395	.74	25
	NP-CCC	4,262	5,372	381,518	1.26	90
	Total	5,028	5,941	400,913	1.18	80
Third	NP-Reg.	3,278	3,223	93,949	.98	29
	NP-CCC	1,091	1,056	51,313	.97	47
	Total	4,369	4,279	145,262	.98	33
All Workings	NP-Reg.	6,691	7,598	893,515	1.14	134
	NP-CCC	10,960	12,692	1,293,167	1.16	118
	Total	17,651	20,290	2,186,682	1.15	124





TABLE 5  
SUMMARY OF RIBES ERADICATION, 1930-1943  
MOUNT BALMAIN NATIONAL PARK

Working	Area	Eradication Type	Acres	Effective Man-Days	Ribes by Species										Total Ribes	Per Acre Basis	
					Ribes cuneifolius	Ribes viscos.	Ribes bracteosum	Ribes wootenianum	Ribes leixiflorum	Ribes coccifolium	Ribes sanguineum	Ribes triete	Men-Days Ribes	Beils			
Longmire	Reproduction	274	397	40,231		1,101		5,409	5,804			58,595	1.45	192			
	Stream	656	1,202	185,437		97,774		53,899	2,330	16		345,214	1.98	543			
	All Types	930	1,599	225,668		98,875		59,308	8,642	16		392,809	1.76	736			
	Reproduction	2,351	218	29,971		19,336				7,915		51,778	9.9	23			
	Pole	704	38	176		1,052				16		1,244	0.55	8			
	All Types	3,055	256	28,247		17,038				7,931		53,216	0.88	47			
	Stream	1,132	4,741	72,360	2,055	440,386		914	11	3,369		519,605	3.58	436			
	All Types	4,247	4,727	100,630	2,055	439,424		914	11	11,820		572,301	1.18	131			
	Reproduction	66	50	6,369	239	21	1,133	550	194			9,006	7.6	132			
	Pole	1,870	2,087	173,790	69,529	539	139,238	1,185	10,801	91	744	395,211	1.12	212			
	Mature	322	264	97,387	12,047							40,224	32	125			
	Stevens Canyon	Reproduction	2,258	4,401	209,275	86,615	560	140,391	1,744	11,040	91	744	445,141	1.06	197		
Stream		423	744	166,356	1,510	4,969	246	8,800	188	98	8	178,501	1.76	423			
All Types		2,681	5,145	375,631	84,125	5,429	140,637	10,564	11,228	189	752	623,732	1.17	233			
Reproduction		48	21	68	7							2,387	44	50			
Pole		332	262	11,276	5,131		6,723	3,221	16,658			44,009	7.9	133			
All Types		380	283	11,344	6,138		6,730	3,221	18,963			46,396	7.4	122			
Stream		48	45	2,653	975		475	545	409			4,669	100	103			
All Types		428	359	14,007	6,713		7,206	3,767	19,372			51,055	7.7	120			
Reproduction		2,739	686	75,289	246	17,108	1,140	5,959	8,303	7,915		115,960	2.5	42			
Pole		2,906	2,387	185,235	75,660	1,591	145,261	4,410	27,459	107	744	441,164	0.88	158			
Mature		322	264	97,387	12,047							40,224	32	125			
White River		All Types	5,929	3,337	239,243	225,753	18,639	147,101	10,374	35,307	8,022	744	537,528	2.55	103		
	Stream	2,297	6,733	425,656	4,140	243,069	718	64,179	3,446	4,073	8	1,043,159	6.94	455			
	All Types	8,224	10,070	771,414	92,893	561,728	147,819	74,553	39,253	12,095	752	1,640,507	1.22	199			
	Reproduction	274	271	10,941		1,136						13,500	7.9	49			
	Stream	614	556	19,977		23,196		2,394	1,455	50		47,043	8.6	77			
	All Types	888	797	30,333		24,332		2,394	2,888	50		60,602	9.0	68			
	Stevens Canyon	Reproduction	797	2,532	49,131	95	171,224				607		221,057	3.22	281		
		Pole	66	12	121		77						298	1.8	3		
		All Types	2,194	1,768	36,884	14,304	2,176	6,864	16,224	4,537			80,369	9.1	37		
		Mature	322	47	1,278	8,011							3,282	1.5	10		
		All Types	2,238	1,817	37,838	15,315	2,176	6,941	16,224	4,537			83,270	1.17	84		
		Stream	274	271	10,941		1,136						13,500	7.9	49		
All Types		2,976	2,484	70,531	16,315	2,330	6,941	16,229	4,537			116,883	0.83	39			
Reproduction		340	283	11,186		1,136		77				13,887	8.3	41			
Pole		2,194	1,768	36,884	14,304	2,176	6,864	16,224	4,537			80,369	9.1	37			
Mature		322	47	1,278	8,011							3,282	1.5	10			
All Types		2,956	2,028	48,744	16,315	3,312	6,941	16,224	5,999			97,536	7.3	34			
Stream		1,735	3,713	101,856	95	184,574	2,339	1,426		657		301,097	2.07	148			
Longmire	Reproduction	274	271	10,941		1,136						13,500	7.9	49			
	Pole	294	1,069	15,970		903		97	15,468			29,488	3.64	100			
	Stream	774	1,171	21,630		15,310		1,416	501	6		35,450	1.51	72			
	All Types	1,068	2,240	34,606		15,315		1,503	15,969	6		84,897	2.10	79			
	Stream	220	551	712		23,344		10,515	20	4,883		24,096	2.50	110			
	Pole	2,503	1,209	1,394	3,196							19,998	1.46	8			
	Stream	858	407	15,450	6,808			703	4			19,442	4.0	22			
	All Types	3,458	1,616	16,844	4,664			227	10,515	723		39,640	4.7	11			
	Stream	2,897	2,278	14,354	3,196			903	10,515	107		49,426	7.9	17			
	Reproduction	1,949	2,169	97,938	2,688	35,821		2,112	505	6		99,207	1.15	53			
	All Types	4,748	4,407	91,742	5,484	36,864	10,515	2,226	20,856	6		147,531	0.93	31			
	Reproduction	548	668	51,242		2,237		5,409	7,266			66,154	1.22	121			
White River	Pole	294	1,069	15,970		903		97	15,468			29,488	3.64	100			
	All Types	842	1,737	64,212		3,140		5,426	22,724			114,502	1.02	11			
	Stream	2,014	2,877	245,300		133,220		87,709	4,755	72		446,735	1.44	280			
	All Types	2,856	4,656	311,112		136,400		63,205	27,439	72		536,308	1.62	188			
	Reproduction	2,351	218	29,971		15,986				7,915		51,778	9.9	23			
	Pole	704	38	176		1,052				16		1,244	0.55	8			
	All Types	3,055	256	28,247		17,038				7,931		53,216	0.88	47			
	Stream	1,132	4,741	72,360	2,055	440,386		914	11	3,369		519,605	3.58	436			
	All Types	4,247	4,727	100,630	2,055	439,424		914	11	11,820		576,201	1.19	133			
	Reproduction	66	50	6,369	239	21	1,133	550	194			9,006	7.6	132			
	Pole	1,870	2,087	173,790	69,529	539	139,238	1,185	10,801	91	744	395,211	1.12	212			
	Sterbo	Mature	322	264	97,387	12,047							40,224	32	125		
All Types		2,258	4,401	209,275	86,615	560	140,391	1,744	11,040	91	744	445,141	1.06	197			
Stream		423	744	166,356	1,510	4,969	246	8,800	188	98	8	178,501	1.76	423			
All Types		2,681	5,145	375,631	84,125	5,429	140,637	10,564	11,228	189	752	623,732	1.17	233			
Reproduction		48	21	68	7							2,387	44	50			
Pole		332	262	11,276	5,131		6,723	3,221	16,658			44,009	7.9	133			
All Types		380	283	11,344	6,138		6,730	3,221	18,963			46,396	7.4	122			
Stream		48	45	2,653	975		475	545	409			4,669	100	103			
All Types		428	359	14,007	6,713		7,206	3,767	19,372			51,055	7.7	120			
Reproduction		5,079	969	86,471	246	18,244	1,217	5,959	9,765	7,915		129,819	1.31	42			
Pole		7,997	6,733	236,890	93,160	4,670	163,340	20,741	52,347	107	744	570,979	0.80	71			
Mature		311	29	14,458								45,315	4.8	68			
All Areas	All Types	11,720	7,913	350,946	108,244	22,214	164,559	28,705	85,197	8,022	744	744,309	2.56	124			
	Stream	5,231	15,577	595,810	6,503	973,554	718	68,697	5,397	4,755	8	1,446,397	1.15	243			
	All Types	17,621	20,220	933,756	114,787	736,458	185,275	95,402	87,554	12,758	752	2,186,682	1.15	124			



## BLISTER RUST CONTROL, GLACIER NATIONAL PARK, 1943

By

M. C. Riley, Technical Supervisor

The blister rust control program on Glacier National Park during the 1943 field season was conducted with one Civilian Public Service camp of 26 men doing first and second working on the East Glacier area. Funds from a regular Park Service appropriation were used to employ an experienced foreman and to cover incidental expenditures for equipment and supplies. Work started on June 16 and was completed on August 19. It had been planned to work at Two Medicine during the season but the area was not in condition to work because of late snow when the crew started and there was not sufficient time remaining when an experienced foreman would be available after finishing at East Glacier.

All first working was completed on the East Glacier area and second working was completed on all ground worked in other years. This work is located in unsurveyed sections 10, 13, 14, 15, T. 34 N., R. 15 W. Montana Meridian. After ribes eradication was finished the foreman spent some time in checking since it had not been possible to secure a checker. This check was not complete enough to give any definite information regarding possible changes in control status for the area. A large portion of the first working contained so many ribes that it will be necessary to do at least one more working. It is possible that this year's work served to place some of the area on a maintenance basis. This will be determined as soon as an adequate check can be made.

The performance of assignees from the Civilian Public Service camp was not as satisfactory as had been anticipated. Some local adjustments were made which improved the situation but conditions prevailed which were not conducive to successful ribes eradication work. The crew did not like the work and this attitude was directly reflected in their productiveness. Since the crew received no remuneration there was a tendency to perform as little work as possible. The men were not properly shod for woods work and there were no experienced men to serve as a nucleus for an efficient crew. From the experience with this particular group it is felt that Civilian Public Service crews should be used on blister rust control work only as a last resort.

A representative of the Bureau of Entomology and Plant Quarantine helped plan, organize and supervise the work. The Bureau also supplied the necessary forms, maps and office supplies for the proper recording and reporting of data. It was not possible for the Bureau representative to spend as much time as formerly on the job, and very little scouting work was accomplished.

### RECOMMENDATIONS

The only ribes eradication work which is urgent for the 1944 season on areas where control work has been started is the rework job at Two Medicine. It is estimated that this will require about 350 man-days. Before the next field season starts a decision should be made as to whether this should be done with a small crew or a large one.

# RESULTS

The following tables show statements of expenditures, results of the field work for 1943 and accumulative results for all work done to date.

TABLE 1

## EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1943 GLACIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 427.35
National Park Service	Regular BLR-5	1,090.34
Total		\$1,517.69

TABLE 2

## CLASSIFIED EXPENDITURES, CALENDAR YEAR 1943 GLACIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	BLR-5	
Sal. perm. men	\$370.58	\$ 769.98	\$1,140.56
Travel and transp.	56.77		56.77
Contractual services		176.36	176.36
Supplies and material		86.63	86.63
Subsistence		57.37	57.37
Total	\$427.35	\$1,090.34	\$1,517.69

TABLE 3  
SUMMARY OF RIBES ERADICATION, 1943  
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme		Man-Days	Ribes
East Glacier	First	Pole	281	511	20,228	9,089	4,304	24,763	58,384	1.82	208
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	302	771	20,299	9,247	4,304	69,709	103,559	2.55	343
	Second	Pole	86	200	21,816	2,492	9,507	1,271	35,086	2.33	408
		All Types	86	200	21,816	2,492	9,507	1,271	35,086	2.33	408
	All Workings	Pole	367	711	42,044	11,581	13,811	26,034	93,470	1.94	255
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	388	971	42,115	11,739	13,811	70,980	138,645	2.50	357

TABLE 4  
SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1939-1943  
GLACIER NATIONAL PARK

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
					Man-Days	Ribes
First	NP-Reg.	262	301	37,155	1.15	142
	NP-CCC	2,633	2,833	323,841	1.08	123
	NP-CPS	302	771	103,559	2.55	343
	Total	3,197	3,905	464,555	1.22	145
Second	NP-Reg.	731	763	122,606	1.04	168
	NP-CPS	86	200	35,086	2.33	408
	Total	817	963	157,692	1.18	193
All Workings	NP-Reg.	993	1,064	159,761	1.07	161
	NP-CCC	2,633	2,833	323,841	1.08	123
	NP-CPS	388	971	138,645	2.50	357
	Total	4,014	4,868	622,247	1.21	155





TABLE 5

SUMMARY OF RIBES ERADICATION, 1939-1943  
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis		
					Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inermis		Man-Days	Ribes	
Park Headquarters	First	Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89	
		Pole	284	122	13,428	15,364	8,967		37,759	.43	133	
		Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003	
	Second	All Types	681	445	32,708	43,176	32,986		108,870	.65	160	
		Reproduction	134	39	2,876	581	558		4,015	.29	30	
		Pole	127	79	376	964	535		1,876	.62	15	
	All Workings	Brush	39	52	13	973	67	2	1,055	1.33	27	
		All Types	300	170	3,265	2,518	1,160	2	6,945	.57	23	
		Reproduction	492	243	12,745	7,053	16,224		36,022	.49	73	
	Two Medicine	First	Pole	411	201	13,804	16,328	9,502		39,654	.49	96
			Brush	78	171	9,424	22,313	8,420	2	40,159	2.19	515
All Types			981	615	35,973	45,694	34,146	2	115,815	.63	118	
Second		Pole	593	645	40,145	2,705	1,723	8,646	53,219	1.09	90	
		Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191	
		All Upland	653	763	44,080	3,755	6,388	10,480	64,703	1.17	99	
All Workings		Stream	54	480	30,429	438		12,592	43,459	8.89	805	
		All Types	707	1,243	74,509	4,193	6,388	23,072	108,162	1.76	153	
		Pole	90	93	11,318	250		5,658	17,226	1.03	191	
Second		Subalpine	16	20	1,495	67		2,471	4,033	1.25	252	
		All Upland	105	113	12,813	317		8,129	21,259	1.07	201	
		Stream	32	156	46,233	14		25,259	71,506	4.88	2,235	
All Workings		All Types	138	269	59,046	331		33,388	92,765	1.95	672	
		Pole	683	738	51,463	2,955	1,723	14,304	70,445	1.08	103	
		Subalpine	76	138	5,430	1,117	4,665	4,305	15,517	1.82	204	
Lake McDonald		First	All Upland	759	876	56,893	4,072	6,388	18,609	85,962	1.15	113
			Stream	85	636	75,662	452		37,851	114,965	7.41	1,337
	All Types		845	1,512	133,555	4,524	6,388	56,460	200,927	1.79	258	
	Second	Mature	1,410	913	21,077	4,253	34,175		59,505	.65	42	
		Stream	11	39	5,184	35	1,602		6,821	3.55	620	
		All Types	1,421	952	26,261	4,288	35,777		66,326	.67	47	
	All Workings	Mature	282	303	3,173	1,305	15,996		20,474	1.07	73	
		Stream	11	21	998	130	1,294		2,422	1.91	220	
		All Types	293	324	4,171	1,435	17,230		22,896	1.11	78	
	East Glacier	First	Mature	1,692	1,216	24,250	5,558	50,171		79,979	.72	47
			Stream	22	60	6,182	165	2,896		9,243	2.73	420
All Types			1,714	1,276	30,432	5,723	53,067		89,222	.74	52	
Second		Pole	367	1,005	44,305	14,739	11,042	65,936	136,022	2.74	371	
		Stream	21	260	71	158		44,946	45,175	12.38	2,151	
		All Types	388	1,265	44,376	14,897	11,042	110,882	181,197	3.26	467	
All Workings		Pole	86	200	21,816	2,492	9,507	1,271	35,086	2.33	408	
		Pole	453	1,205	66,121	17,231	20,549	67,207	171,108	2.66	378	
		Stream	21	260	71	158		44,946	45,175	12.38	2,151	
All Areas		First	All Types	474	1,465	66,192	17,389	20,549	112,153	216,293	3.09	456
			Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
	Pole		1,244	1,772	97,878	32,808	21,732	74,582	227,000	1.42	182	
	Second	Mature	1,410	913	21,077	4,253	34,175		59,505	.65	42	
		Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003	
		Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191	
	All Workings	All Upland	3,111	3,126	142,170	65,923	84,591	76,416	369,100	1.00	119	
		Stream	85	779	35,684	631	1,602	57,538	95,455	9.06	1,110	
		All Types	3,197	3,905	177,854	66,554	86,193	133,954	464,555	1.22	145	
	Second	Reproduction	134	39	2,876	581	558		4,015	.29	30	
		Pole	303	372	33,510	3,706	10,042	6,929	54,187	1.23	179	
		Mature	282	303	3,173	1,305	15,996		20,474	1.07	73	
	All Workings	Brush	39	52	13	973	67	2	1,055	1.33	27	
		Subalpine	16	20	1,495	67		2,471	4,033	1.25	252	
		All Upland	774	786	41,067	6,632	26,663	9,402	83,764	1.02	108	
	All Workings	Stream	43	177	47,231	144	1,294	25,259	73,928	4.12	1,719	
		All Types	817	963	88,298	6,776	27,957	34,661	157,692	1.18	193	
Reproduction		492	243	12,745	7,053	16,224		36,022	.49	73		
All Workings	Pole	1,547	2,144	131,388	36,514	31,774	81,511	281,187	1.39	182		
	Mature	1,692	1,216	24,250	5,558	50,171		79,979	.72	47		
	Brush	78	171	9,424	22,313	8,420	2	40,159	2.19	515		
All Workings	Subalpine	76	138	5,430	1,117	4,665	4,305	15,517	1.82	204		
	All Upland	3,285	3,912	183,237	72,555	111,254	85,818	452,864	1.01	117		
	Stream	129	956	82,915	775	2,896	82,797	169,383	7.41	1,313		
All Workings	All Types	4,014	4,868	266,152	73,330	114,150	168,615	622,247	1.21	155		





DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION AND PROGRESS  
OF RIBES ECOLOGY WORK IN THE NORTHWESTERN REGION FOR 1943

By

V. D. Moss, Forest Ecologist  
and

H. R. Offord, Pathologist

I. SUMMARY

A. Improvement in Methods of Ribes Eradication

1. Status of work. Special reports have been prepared on two important regional eradication problems, namely: "The interrelation between size of crew, width of crew strip and method of laying string line on ribes eradication," and "A comparison between two methods of employing crews in a gang formation on ribes eradication." These two special reports have been issued by the Spokane office.

The past season, studies were instituted in the treatment of Ribes lacustre with ammonium sulfamate spray. A fall series of treatments were made on Crystal Creek of the St. Joe Forest. Two additional applications are contemplated for the coming field season, one representing spring conditions and the other applied during the summer months.

2. Future work. Extensive studies in hand methods of ribes eradication are planned for the coming season which relate to the immediate protection of white pine seedlings on recently cutover lands. The objective of the study will be to determine whether adequate protection measures can be established on recently cutover lands by undertaking two thorough workings the second and fifth years following logging as against four fast yearly workings commencing the second and continuing through the fifth year following logging. An attempt will be made to expend approximately the same number of total man-days per acre by both methods of work. The major difference between the two methods relates to thorough coverage by the two workings as against concentrating on bushes coming into larger live stem classes with each season's new growth. No additional methods work will be undertaken except the continuation of ammonium sulfamate treatments on R. lacustre.

B. Effects of Grazing on the Regeneration of Ribes and Western White Pine

1. Status of work. Studies relating to four grazing topics are being maintained: (a) Effects of grazing recently cutover lands on the germination, growth and development of ribes and western white pine seedlings, (b) Effects of deferred grazing on . . . seedlings, (c) Effects of controlled grazing on . . . seedlings, and (d) Effects of continuous seasonal grazing of old logged and burned-over lands on the regeneration of ribes and western white pine seedlings. Controlled grazing studies are being carried on in cooperation with the Forest Service, School of Forestry of the University of Idaho and the Potlatch Timber Protective Association. Study areas are examined at least twice a season, before and after sheep have been on the areas. Significant conclusions reached on many of these studies are stated under topic headings.

(a) Five plots were established to study the effects of grazing recently cutover lands on the germination and subsequent growth of ribes and western white pine seedlings. Three of these plots are located on the Clearwater Forest and two on the St. Joe Forest. Detailed results of two of the Clearwater plots are herein reported. All ribes were removed this past season from these two plots, but observations will be continued to denote further regeneration. Studies of these two plots have shown the following facts:

(1) Average number of main stems and laterals, feet of live stem, bush heights and number of terminal buds and leaves per bush have all been greater for ribes subjected to five years' grazing as against those protected from sheeping by the construction of exclosures.

(2) No significant ribes regeneration occurred following the disturbance directly caused by or resulting from grazing. More ribes seedlings have appeared during the past four seasons in the exclosures or areas protected from grazing than on the controls of grazed portions of the plots.

(3) Some ribes have been destroyed by trampling and browsing of sheep.

(4) Evidence points to the fact that favorable conditions are created by grazing for the germination of white pine seed.

(5) No significant loss of pine seedlings has resulted from the effects of grazing. Heavy loss of white fir and Douglas fir seedlings has occurred from trampling by sheep.

(b) Deferring grazing from cutover lands which have been under range use by sheep for some years does not appear to establish conditions favoring increased efficiency in ribes eradication by comparison with lands continuing to be grazed. The screening of ribes by the luxuriant development of associated vegetation increased on the areas protected from grazing, thus making more difficult the task of finding the ribes. Furthermore, ribes regeneration has taken place to a greater extent in the exclosure than on the controls. Germination of pine seed has been generally greater on the areas being sheeped.

(c) The effects of controlling the intensity of grazing by sheep on cutover lands have shown that overgrazing on slopes greater than 40 per cent may often result in the germination of ribes seedlings. Moderate grazing (approximate rate of 21 acres per animal unit) appears to cause no ribes regeneration problem.

(d) The effects of grazing sheep year after year on old logged and burned-over areas that have become sodded to varying degrees have little or no influence on ribes regeneration. The disturbance caused by the trampling of sheep on the range results in a favorable condition for the germination of pine seed. Increased stocking of such areas can be expected as a result of sheeping.

2. Future work. Investigations will be continued on the problems of grazing and ribes eradication. Ribes will be removed from each of the plots after five years' study. Data will continue to be taken on further ribes regeneration and on the germination and subsequent development of white pine seedlings.

#### C. Ecological Studies of Ribes and Western White Pine

1. Status of work. Investigations were continued the past season on the following studies: (a) The effects of variable light and moisture conditions on the germination, growth and development of R. viscosissimum, R. lacustre and Pinus monticola, (b) Resprouting habits of R. lacustre, (c) Ribes regeneration key for the western white pine region, (d) Slash disposal measures and their effects upon the regeneration and development of ribes and western white pine, (e) Stand improvement practices in relation to the ecological development of ribes and (f) Direct seeding of western white pine.

(a) The study of variable light and moisture conditions in relation to the germination, growth and development of ribes and western white pine seedlings was established under conditions of full sun, half shade and full shade light intensities. At each of these light stations seed of ribes and pine was sown on natural duff, mineral and burned-mineral soil surfaces. Major results obtained from this study are as follows:

(1) The peak of germination of R. viscosissimum seed was reached the first season with only a small portion of seed germinating the second and third years under all conditions of light and soil moisture. The peak of germination for R. lacustre seed was reached the second year under all conditions except on mineral soil at the full sun station. Heavy germination of this species has occurred each season on nearly all soil surfaces at the three light stations. The majority of pine seed germinated the first season with some carry-over into the second and third years.

(2) Germination of both ribes and pine seed generally increased from conditions of full sun to conditions of greater moisture content and lower soil temperatures under full shade. Soil moisture and soil temperature relations govern the extent of germination that has occurred on any soil surface under the three intensities of light. Percentage germination (of total seeds sown) was highest in nearly all cases on mineral soil and lowest on the natural duff surface.

(3) Under the three intensities of light, growth and development of ribes were significantly greater on the burned-mineral soil surface than on the mineral and duff surfaces. Minimum growth of ribes occurred on mineral soil.

(4) Mortality of ribes was highest under conditions of full shade with minimum loss occurring under conditions of half shade. The important causal agencies of mortality for both pine and ribes seedlings were damping-off fungi, winter kill and high surface soil temperatures with some loss from drought and insects.

(b) The study of resprouting of R. lacustre was undertaken to determine the size and portion of roots capable of asexual development. Three treatments were employed, namely: (1) roots cut leaving crown tissue attached, (2) roots cut about 1 inch below the root crown and (3) roots cut at least 6 inches in all directions from the root crown proper. These series of treatments were made to bushes on north and south exposures during the spring, summer and fall seasons. The following are the important results of this study:

(1) All resprouting was restricted to roots having definite root-crown tissue. Roots beyond 6 inches in all directions from the root-crown proper need not be removed.

(2) All aerial plant parts such as layering stems, buried stems, stolons, and small pieces of broken stem must be removed from the ground and placed on some object to dry.

(3) Resprouting of R. lacustre roots with crown tissue increases as the season advances from spring to the fall season.

(4) Likelihood of R. lacustre roots resprouting is significantly greater on south-facing slopes than on northern aspects.

(5) Many roots severed from the root-crown proper have retained healthy appearing cambium for more than one year without resprouting. These roots will be re-examined this coming field season to determine their condition.

(c) The ribes regeneration key developed for the western white pine type has proven highly efficient in establishing a systematic basis for judging the potential ribes seedling contingency associated with an area. The principle involved in the derivation of the key is one of systematizing all ecological facts which indicate an association favorable to the regeneration of ribes. Work is being continued on reclassifying species associations and adjusting weights assigned to the various vegetative classes comprising the key. The regeneration key is now available for practical field use.

(d) Studies of slash disposal measures in the western white pine type are being carried on in cooperation with the Forest Service, Potlatch Forests, Inc. and the Slash Disposal Committee of the Inland Empire Section of the Society of American Foresters. The past season slash disposal studies involved continuation of work on areas receiving partial disposal and areas receiving complete disposal measures. On areas of partial disposal, logging slash has been piled and burned along right-of-ways, along ridges and an occasional fire lane has been built between ridges to break the main body of slash into units around five acres each. This method materially reduces the fire hazard to relatively safe standards while preventing excessive loss of seed trees. Ribes regeneration has been fairly light on these areas with nearly all seedlings originating along skid trails, roads and around the few scattered, burned slash piles. Pine seedlings are appearing freely throughout the areas under all conditions of soil surfaces.

Studies of complete disposal have been made of areas subjected to double burns. The first burn was obtained by permitting a slow ground fire to creep through the area in late fall. This resulted in materially reducing the fire hazard while killing the majority of defective and unmerchantable species of trees left on the area after logging. Trees which had not fallen naturally by the end of the first or second years after first burning were felled and the entire area given an intense second burn during the early fall season. Ribes germinating following the first burn were killed by the hot second burn. Since most of the duff mantle was consumed by the second burn ribes regeneration has been at a minimum. This type of treatment in the disposal of slash and defective species remaining on an area after all commercial logs have been taken is by far the most encouraging method yet demonstrated for minimizing the ribes eradication problem while preparing an area for planting.

(e) Ribes ecological studies are being continued in cooperation with Timber Management of the Forest Service and the Northern Rocky Mountain Forest and Range Experiment Station relating to stand improvement practices for the western white pine type. The bulk of this work is being carried on in the Kaniksu and Coeur d'Alene National Forests. The past season ecological observations were made of stand improvement studies established by the Deception Creek Experiment Station on the Coeur d'Alene Forest and of thinnings, weedings and hemlocking on the Kaniksu Forest.

(f) Studies in direct seeding of western white pine were continued and expanded in scope during the past season on the Kaniksu. Encouraging results were obtained for both spot planting and broadcast sowing in the use of germinated seed. Studies are now under way on this problem at Moscow, Idaho, and will be carried into the field this coming season.

## II. FIELD WORK

### A. Treatment of R. lacustre with Ammonium Sulfamate Spray

On September 8 six milacre plots were located on which a reasonably heavy coverage of R. lacustre occurred. The plots are on Crystal Creek on the old sheepherder's road about two miles above Fernwood. To reach the plot area it is necessary to walk a few chains toward Crystal Creek down a small draw from the point at which the old road becomes impassable and then follow the railroad grade downstream about a quarter mile.

On September 9 the six R. lacustre plots were treated by aqueous ammonium sulfamate applied as a combination top spray and soil drench at the uniform dosage rate shown in table 1.



TABLE 1

RIBES DATA AND DOSAGE OF AMMONIUM SULFAMATE  
R. LACUSTRE MILACRE PLOTS  
 CRYSTAL CREEK, ST. JOE NATIONAL FOREST, 1943

Plot Number	Pounds of Chemical Per Milacre	Ribes Data		Per Cent of Milacre Plot Occupied by Ribes
		No. of Bushes	Feet of Live Stem	
3	<u>1</u> <sup>1/</sup>	11	250	45
1	2	18	550	65
5	3	<u>13</u> <sup>2/</sup>	500	85
2	5	16	375	80
6	6	13	400	70
4	8	18	600	80

<sup>1/</sup>This dosage was dissolved in 2 gallons of water; all others dissolved at rate of 1 pound chemical per gallon of water.

<sup>2/</sup>On this plot in addition to these R. lacustre there were three R. petiolare, having a total of 25 F.L.S.

Results from these plots will not be available until the early summer of 1944.

B. Effects of Grazing on the Regeneration of Ribes and Western White Pine

Effects of Grazing Recently Cutover Lands on the Germination, Growth and Development of Ribes and Western White Pine Seedlings

Previous discussions of this study have been given in the 1939 to 1942 annual reports. Data presented in table 2 are final summaries for plots 1 and 2 on the Clearwater Forest which have been subjected to five years or seasons of grazing by sheep. All ribes were removed from these plots at the close of the past field season. Continued observations will be made of these studies to denote any further ribes regeneration and to undertake a detailed study on the regeneration and growth of western white pine seedlings.

TABLE 2

COMPARISON OF MORPHOLOGICAL FEATURES OF RIBES  
ON GRAZED AND UNGRAZED AREAS OF PLOTS 1 AND 2  
IN THE CLEARWATER FOREST

Year Data Taken	Total No. Ribes	Averages Per bush								Total Number Leaves	
		Total Main Stems		Total Laterals		Total Feet Live Stem		Bu. Ht.	Number Terminal buds		
		No.	F.L.S.	No.	F.L.S.	Old	New	Ft.			
Plot No. 1 - Exclosure											
1939	76	1.11	.19	.05	.00	.06	.14	.27	1.03		5.61
1940	79	1.10	.39	.96	.12	.13	.34	.35	1.97		10.61
1941	77	1.14	.79	1.36	.29	.49	.59	.72	2.50		14.97
1942	73	1.19	1.15	3.77	.84	1.03	.90	1.01	3.27		27.07
1943	72	1.13	1.40	5.65	1.51	1.95	.97	1.18	6.40		33.42
Plot No. 1 - Control											
1939	92	1.04	.27	1.11	.12	.14	.23	.24	1.14		6.65
1940	93	1.09	.53	2.63	.57	.41	.69	.60	3.33		22.42
1941	83	1.16	.83	4.42	1.20	1.01	1.02	1.02	4.62		24.83
1942	88	1.27	1.14	8.61	2.46	1.89	1.72	1.32	8.69		45.36
1943	87	1.22	1.28	11.10	3.28	3.47	1.09	1.49	11.29		55.49
Plot No. 2 - Exclosure											
1939	39	1.20	.32	1.03	.14	.13	.23	.31	2.18		7.85
1940	40	1.23	.61	1.63	.30	.45	.45	.54	2.78		12.95
1941	34	1.35	1.02	2.32	.36	.80	.57	.31	3.44		15.56
1942	37	1.32	1.20	3.92	.65	1.23	.62	.97	4.65		23.47
1943	35	1.20	1.25	5.40	.83	1.46	.79	1.10	6.17		30.34
Plot No. 2 - Control											
1939	17	1.59	1.17	2.94	.19	.61	.74	.37	2.51		6.35
1940	17	1.76	1.43	4.00	.41	1.35	.43	.78	5.55		30.94
1941	15	1.33	.99	6.93	.76	1.26	.52	.95	7.20		27.47
1942	15	1.73	1.67	6.40	.89	1.72	.95	1.16	7.07		34.60
1943	15	1.53	1.59	8.67	1.17	2.17	.63	1.24	8.40		40.73

Plot 1, located on an easterly exposure, had 76 ribes on the exclosure and 92 on the control or grazed portion at the start of the study. In five years' time ribes populations in the exclosure have varied from 79 bushes in 1940 to 72 bushes in 1943. Ribes populations on the control have varied from a high of 93 bushes in 1940 to 87 bushes in 1943. Ribes populations on the exclosure and control by comparison with one another have neither significantly increased nor decreased during this period.

Plot 2, located on a westerly aspect, had 39 ribes in the exclosure and 17 on the control at the start of the study. Ribes populations in the exclosure have varied from 40 bushes in 1940 to 35 bushes in 1943. Ribes on the control have varied from 17 bushes in 1939 to 15 bushes in 1943. Sheeping has thus neither significantly increased nor decreased ribes populations over natural conditions in the protected exclosure.

Comparisons between exclosures and controls for main stems, laterals, feet of live stem, bush heights, number of terminal buds and number of leaves per bush result in some interesting relations. Main stems per bush for ribes in the exclosure of plot 1 increased from 1.11 with .19 feet of live stem in 1939 to 1.18 main stems with 1.40 feet of live stem per bush in 1943. On the control, main stems increased from 1.04 with .27 feet of live stem per bush in 1939 to 1.22 main stems with 1.28 feet of live stem in 1943. Main stems per bush for ribes in the exclosure of plot 2 commenced with 1.20 with .32 feet of live stem increased to 1.35 with 1.02 feet of live stem in 1941 and cropped back to the original 1.20 main stems per bush in 1943 with 1.25 feet of live stem. On the control, main stems varied from 1.59 with 1.17 feet of live stem in 1939 to a high of 1.76 with 1.43 feet of live stem in 1940. In 1941, main stems per bush decreased to 1.33, increased in 1942 to 1.73 and fell off to 1.53 with 1.59 feet of live stem in 1943. Sheeping was found responsible for about half the loss in main stems on the control with natural die-back accounting for the remaining loss as well as that occurring on the exclosure.

Laterals per bush for ribes in the exclosure of plot 1 increased from .05 in 1939 to 5.65 with 1.51 feet of live stem in 1943. On the control, laterals increased from 1.11 in 1939 to 11.10 with 3.28 feet of live stem in 1943. Laterals per bush for ribes in the exclosure of plot 2 increased from 1.08 with .14 feet of live stem in 1939 to 5.40 with .88 feet of live stem in 1943. On the control, laterals increased from 2.94 with .19 feet of live stem in 1939 to 8.67 with 1.17 feet of live stem in 1943. Sheeping has to some degree been responsible for increasing the number of laterals per bush but the major difference occurred in the number of bushes forced to produce laterals by nipping of terminal buds.

Total feet of live stem per bush for ribes in the exclosure of plot 1 increased from .20 in 1939 to 2.92 feet in 1943. On the control, total live stem increased from .42 feet per bush in 1939 to 4.56 feet in 1943. Ribes in the exclosure of plot 2 increased from .46 feet of live stem in 1939 to 2.25 feet in 1943. On the control, total live stem per bush increased from 1.35 feet in 1939 to 2.85 feet in 1943. Ribes on the controls of plots 1 and 2 not only have more live stem per bush, but they are noted to be taller than those on the exclosures. Ribes in the exclosure of plot 1 had an average bush height of .17 feet in 1939 which increased to 1.18 feet in 1943. Average height per bush on the control in 1939 was .34 and this increased to 1.49 in 1943. Ribes in the exclosure of plot 2 had an average height of .31 feet in 1939 which increased to 1.10 feet in 1943. On the control, average height of ribes increased from .47 feet in 1939 to 1.24 feet in 1943. The ecological conditions found affecting both the amount of live stem and heights of ribes have been the degree of competition developing around each ribes bush. Growth of ribes in the exclosure is being significantly affected by the high degree of competition developing around them from associated vegetation. Grazing of the controls has kept competition open and ribes have consequently had more ideal conditions for growth.

Average bush height for ribes in the exclosure of plot 1 increased from .27 in 1939 to 1.18 feet in 1943. On the control, average height per bush increased from .24 feet in 1939 to 1.49 feet in 1943. Ribes in the exclosure of plot 2 increased from .31 feet in 1939 to 1.10 feet in height per bush in



1943. Average height per bush of ribes in the control increased from .37 feet in 1939 to 1.24 feet in 1943.

Number of terminal buds on bushes in the exclosure of plot 1 increased from 1.08 per ribes in 1939 to 6.40 in 1943. On the control, average terminal buds per bush increased from 1.14 in 1939 to 11.29 in 1943. Terminal buds on ribes in the exclosure of plot 2 increased from 2.18 in 1939 to 6.17 in 1943. On the control the increase was from 2.51 in 1939 to 8.40 in 1943. Nipping of terminal buds by sheep on main stems and laterals stimulates the formation of many adventitious laterals which accounts for the greater number of terminal buds on bushes subjected to five years' grazing.

Average leaves per bush for ribes in the exclosure of plot 1 increased from 5.61 in 1939 to 33.42 in 1943. Leaves on bushes in the control increased from 6.65 in 1939 to 55.49 in 1943. Ribes in the exclosure of plot 2 had an increase in leaves per bush from 7.85 in 1939 to 30.34 in 1943. Average leaves for ribes on the control increased from 6.35 in 1939 to 40.73 in 1943. The greater number of leaves for bushes on the control has resulted from the increase of laterals caused by nipping of terminal buds by the sheep.

TABLE 3

COMPARISONS OF SURVIVAL AND MORTALITY OF RIBES  
SEEDLINGS ON GRAZED AND UNGRAZED PORTIONS OF  
PLOTS 1 AND 2 IN THE CLEARWATER FOREST

	Exclosure			Control		
	Number Alive	Number Dead	Total	Number Alive	Number Dead	Total
Plot No. 1-Ribes by Year of Origin and Mortality						
1935 to 1939	61	12	73	85	7	92
1940	9	2	11	2	0	2
1941	1	1	2	0	0	0
1942	0	0	0	0	0	0
1943	1	0	1	0	0	0
Total	72	15	87	87	7	94
Plot No. 1-Pine by Year of Origin and Mortality						
1935 to 1939	195	52	247	172	58	230
1940	19	2	21	18	3	21
1941	3	1	4	1	2	3
1942	4	1	5	2	3	5
1943	4	0	4	11	0	11
Total	225	56	281	204	66	270
Plot No. 2-Ribes by Year of Origin and Mortality						
1935 to 1939	32	11	43	15	2	17
1940	1	0	1	0	0	0
1941	2	0	2	0	0	0
1942	0	0	0	0	0	0
1943	0	0	0	0	0	0
Total	35	11	46	15	2	17
Plot No. 2-Pine by Year of Origin and Mortality						
1935 to 1939	58	13	71	53	14	67
1940	3	0	3	10	2	12
1941	2	1	3	1	4	5
1942	2	1	3	4	4	8
1943	0	0	0	5	0	5
Total	65	15	80	73	24	97

In table 3 are shown the number of ribes and pine seedlings by years of origin. For the years 1935 to 1939 are shown the number of ribes and pine seedlings originating on the areas from the time of logging up to the time the study was established and sheep were brought in for the first time. Grazing does not appear to have affected the regeneration of ribes seedlings over a four-year period since 11 seedlings have appeared on the exclosure of plot 1 during this time as against 2 seedlings on the control. Three ribes seedlings have appeared on the exclosure of plot 2 and none on the control. Thirty pine seedlings have originated on the exclosure of plot 1 and 32 on the control. On plot 2 seven pine seedlings have regenerated on the exclosure and 20 on the control. The effects of sheeping on the regeneration of ribes and pine seedlings is a problem of some years' duration. It can be

stated, however, that for the period of four years no evidence has been found which would substantiate a statement that sheep grazing is causing a ribes regeneration problem in the region. Evidence points toward the possibility that moderate or controlled grazing establishes a condition favorable to the germination of pine seedlings.

TABLE 4

CLASSIFICATION OF PINE AS TO YEAR OF ORIGIN, NUMBER INFECTED  
AND CAUSAL AGENCIES OF MORTALITY FOR THE GRAZED AND  
UNGRAZED PORTIONS OF PLOTS 1 AND 2 IN THE CLEARWATER FOREST

	Year of Origin	No. Pine	Number Pine Infected	Causal Agencies of Mortality				Total Dead Pine
				Blister Rust	Natural Causes	Rodents	Sheep	
Plot No. 1 Exclosure	Up to 1938	144	58	10	16			26
	1939	105	19	5	21			26
	1940	21			2			2
	1941	4			1			1
	1942	5			1			1
	1943	4						
Total		281	77	15	41			56
Plot No. 1 Control	Up to 1938	136	47	10	23			33
	1939	94	24	6	18		1	25
	1940	21	2		2		1	3
	1941	3			2			2
	1942	5			3			3
	1943	11						
Total		270	73	16	48		2	66
Plot No. 2 Exclosure	Up to 1938	35	10		3			3
	1939	36	6	2	8			10
	1940	3						
	1941	3			1			1
	1942	3			1			1
	1943							
Total		80	16	2	13			15
Plot No. 2 Control A and B	Up to 1938	31	2		4	3		7
	1939	36	1	1	5	1		7
	1940	12			2			2
	1941	5			4			4
	1942	8			4			4
	1943	5						
Total		97	3	1	19	4		24

In table 4 are shown the number of pine seedlings by year of origin, number of pine infected and causal agencies of mortality for ribes on the exclosures and controls of plots 1 and 2. Blister rust has been the causal agency of mortality for 15 seedlings on the exclosure and 16 seedlings in the control of plot 1. Forty-one seedlings have succumbed from natural causes on the exclosure and 48 on the control. Two seedlings were lost from sheeping on the control.

On plot 2, two seedlings were killed by blister rust on the exclosure and one in the control. Natural causes removed 13 seedlings in the exclosure and 19 from the control. Four seedlings were killed by rodents on the control and none were lost from sheepling. Sheep have not been responsible for any significant loss of seedlings on either of these two plots.

In conclusion, the following facts seem worthy of emphasis: (1) Height and number of stems, lateral and terminal buds and leaves of ribes increase as the result of grazing, (2) No ribes regeneration problem appears to be associated with the disturbance caused by grazing, (3) Evidence points to the fact that conditions are created by grazing which are favorable to the germination of pine seed, (4) No significant loss of pine seedlings has occurred from the effects of grazing by sheep.

The Effects of Variable Light and Moisture Conditions on the Germination, Growth and Development of *R. lacustre*, *R. viscosissimum* and *P. monticola*

Previous reports on this study have been made on pages 122 to 126 of the 1940 annual report, pages 119 to 126 of the 1941 annual report, and pages 124 to 128 of the 1942 report.

This ecological study was established in 1940 for the purpose of measuring important factors influencing germination, survival and growth of the two major species of ribes and western white pine under full sun, half shade and full shade light intensities. At each of these light stations seed of ribes and pine were sown on natural duff, mineral, and burned-mineral soil surfaces. Seedbeds were examined for germination at ten-day intervals during the first growing season and at approximately monthly intervals during the second and third years. During the month of August and the early part of September of each season, intensive studies were made of mortality, aerial and root growth, and soil moisture and temperature. Soil samples were taken at the close of each season for hydrogen-ion determinations.

All ribes were removed from the plots upon termination of growth for the third season. This was accomplished by pulling the bushes from three of the five subplots and cutting bushes at or below ground level from the two remaining subplots of each soil surface. In the latter case bushes were cut with hand pruning shears leaving the ground undisturbed to permit continued observation on germination of total seed sown. On the three subplots where bushes were pulled, the objective is one of determining what effects the disturbance will have in stimulation of further germination. The disturbance was timed to correspond with that caused by initial eradication of recently cutover areas, first working being undertaken when majority of ribes are three years of age. Because ribes numbers varied between subplots, a hundred per cent disturbance was made to a depth of 1/2 inch after the bushes had been pulled. This was done in order to obtain comparable conditions within and between subplots and to obtain knowledge of what to expect from maximum disturbances of the three soil surfaces.

TABLE 5

NUMBER OF RIBES AND WHITE PINE SEED GERMINATING DURING  
THE SEASONS 1941, 1942 AND 1943, TOTAL SEED GERMINATING DURING THIS PERIOD,  
AND PER CENT OF TOTAL SEED SOWN GERMINATING

Surface	Species	Light Intensity	Number Seed Germinating by Seasons			Total Seed Germinating	Per Cent of Total Seed Sown Germinating
			1941	1942	1943		
Duff	<i>Ribes lacustre</i>	Full Sun	15	674	19	708	4.4
		Half Shade	42	1,343	239	1,629	10.2
		Full Shade	771	5,968	479	7,218	45.1
	<i>Ribes viscosissimum</i>	Full Sun	16	2	0	18	.1
		Half Shade	54	1	0	55	.3
		Full Shade	238	0	68	356	2.2
	Western White Pine	Full Sun	20	6	0	26	1.3
		Half Shade	49	90	5	144	7.2
		Full Shade	341	212	37	1,090	54.5
Mineral	<i>Ribes lacustre</i>	Full Sun	3,184	2,134	57	5,375	33.6
		Half Shade	2,725	6,078	367	9,170	57.3
		Full Shade	1,937	6,191	1,992	10,120	63.2
	<i>Ribes viscosissimum</i>	Full Sun	1,322	7	0	1,329	8.3
		Half Shade	1,092	11	0	1,103	6.9
		Full Shade	1,083	0	3	1,086	6.8
	Western White Pine	Full Sun	893	14	0	897	44.8
		Half Shade	1,170	29	11	1,210	60.5
		Full Shade	1,434	44	21	1,499	74.9
Burned- Mineral	<i>Ribes lacustre</i>	Full Sun	1,966	5,967	23	7,956	49.7
		Half Shade	2,650	8,493	437	11,580	72.4
		Full Shade	2,233	6,326	1,183	9,742	60.9
	<i>Ribes viscosissimum</i>	Full Sun	740	13	0	753	4.7
		Half Shade	1,556	19	0	1,575	9.8
		Full Shade	1,554	0	44	1,598	10.0
	Western White Pine	Full Sun	314	1	0	315	15.7
		Half Shade	1,200	39	7	1,246	62.3
		Full Shade	1,379	49	13	1,441	72.0

In table 5 the number of ribes and pine seed germinating during the seasons 1941, 1942 and 1943 are shown for the three soil surfaces under the three intensities of light. Values are also given for the total number of seeds germinating and the per cent of total seed sown germinating during the three years. A total of 16,000 ribes seed was sown on each plot or soil surface. This was at the rate of 800 seeds per square foot. Pine was sown at the rate of 100 seeds per square foot, totaling 2,000 for each plot.

The peak of germination for *R. lacustre* seed was reached the second season with the exception of seed on mineral soil at the full sun station. The peak of germination for *R. viscosissimum* occurred the first season with appreciably no seedlings appearing the second or third years. The bulk of



pine seed germinated the first season with the exception of seed sown on duff surface at the half shade station. The ribes regeneration problem in the Northwestern Region is thus one of prolonged germination for R. lacustre and one of short duration for R. viscosissimum.

The type of soil surface was found to materially affect the extent of germination through regulation of soil moisture and soil temperature. The degree to which these climatic and edaphic factors vary is related to the intensity of light; soil moisture increasing toward conditions of full shade and soil temperature decreasing toward conditions of full shade. Of the total number of seeds germinating, R. lacustre increased from conditions of full sun to full shade with the exception of seed on burned-mineral at the half shade station. Germination of R. viscosissimum seed increased from conditions of full sun to full shade on duff and burned-mineral soils. On mineral soil, germination was highest at the full sun station and decreased toward conditions of full shade. Germination of pine seed increased on all three soil surfaces from full sun to conditions of full shade.

The per cent of total seed sown which has germinated in the three seasons gives some interesting comparisons between species as well as between soil surfaces and light intensities. Seed of R. lacustre germinated far more readily than seed of R. viscosissimum under all intensities of light and on all three soil surfaces. These differences are truly the result of reactions between the two species of seeds and their environment because previous laboratory controlled germination tests on samples of seed from the same lots showed that each lot contained about the same percentage of viable seed. Duff surface is not a good medium for seed germination except under moist conditions of full shade. Differences in germination of seed on mineral and burned-mineral soil surfaces are pronounced at the full sun station.

Mortality of ribes seedlings has been heaviest under conditions of full shade. Ribes viscosissimum seedlings generally disappear the same season of germination at this station, but many R. lacustre seedlings persist through the second and third years. Heavy mortality of both ribes and pine seedlings has occurred on duff and burned-mineral soil surfaces at the full sun station. High surface soil temperatures and winter kill have been factors largely responsible for loss of seedlings at this station. Minimum mortality of both ribes and pine seedlings has occurred at the half shade station. Causal agencies of mortality have been losses from high surface soil temperatures, drought, winter kill, damping-off fungi and insects.

TABLE 6

pH MEASUREMENTS OF SOIL SAMPLES TAKEN FROM LIGHT-MOISTURE PLOTS,  
LIGHT CONDITIONS AND SOIL SURFACES AS SHOWN

Soil Zone	pH of Soil Sample											
	Duff Surface				Mineral Surface				Burned-mineral Surface			
	1940	1941	1942	1943	1940	1941	1942	1943	1940	1941	1942	1943
Full Sun Station												
Surface	5.04	5.33	5.30	5.53	5.99	6.18	6.10	6.29	7.49	7.16	7.29	7.53
6-inch	5.57	5.84	5.71	6.10	5.67	6.01	5.97	6.18	5.59	6.26	5.90	6.27
12-inch	5.79	5.75	6.10	6.29	5.92	5.92	5.89	6.18	6.62	6.18	6.18	6.10
Half Shade Station												
Surface	5.29	5.27	5.09	5.67	5.79	5.84	6.13	6.02	7.22	6.95	6.60	6.39
6-inch	6.01	6.35	6.31	6.10	5.97	6.26	6.10	6.10	6.05	6.24	6.18	6.37
12-inch	5.30	6.01	6.01	6.10	5.72	5.93	5.84	6.01	5.92	5.96	5.90	6.18
Full Shade Station												
Surface	5.36	5.17	5.58	5.53	6.01	6.01	6.13	6.22	7.20	7.20	7.28	7.03
6-inch	5.92	5.90	5.75	6.34	5.83	6.01	5.84	6.42	5.58	5.82	6.18	6.52
12-inch	5.30	5.67	5.84	6.10	5.63	5.67	6.01	6.27	5.92	5.84	5.88	6.35

Hydrogen-ion determinations are shown for the four years of sampling in table 6. These values are given for three depths of sampling on the duff, mineral and burned-mineral soil surfaces at each of the light stations. No important change has taken place in pH on the duff surface, the hydrogen-ion concentration decreasing in acidity with depth of sampling. Disturbance of mineral soil has decreased the acidity of the surface sample. Alkalinity of the burned-mineral surfaces has decreased somewhat each year with the leaching of ash into the lower sampling depths.

#### Resprouting Habits of *R. lacustre*

A previous discussion of this study has been given on pages 128 and 129 of the 1942 annual report. The problem involved was one of determining the size and portion of *R. lacustre* roots capable of resprouting. This information was required for the purpose of instructing crews on adequate methods of eradicating this species of ribes which would minimize or prevent asexual regeneration. Distance of broken-off roots from the root-crown proper and size of roots which could resprout were two of the important questions of the study. It had been found that considerable time was often used in having crews search for and remove all roots irregardless of their size or distance the root had been broken off from the root-crown proper. It was estimated that from one half to three fourths of the total pulling time involved in the removal of a *R. lacustre* bush was oftentimes used in digging and searching for roots not capable of resprouting. The objective of the study also covered the extent to which exposure and season of year influenced resprouting. Three root treatments were employed, namely: (1) roots were severed at the crown leaving a portion of crown tissue attached to the root, (2) roots were cut about 1/2 inch to one inch below the root-crown proper and (3) roots were cut at least six inches in all directions from



the root-crown proper. Twenty-five bushes were decapitated for each of the three treatments. Replication of treatments was made during the spring, summer and fall seasons. Final check on the actual number of roots treated and the number resprouting was made at the end of the season following treatment.

TABLE 7

RESPROUTING HABITS OF R. LACUSTRE ROOTS ON A NORTH AND SOUTH EXPOSURE WHEN SEVERED LEAVING CROWN TISSUE ATTACHED, CUT ONE ONCH BELOW CROWN AND SIX INCHES IN ALL DIRECTIONS FROM THE ROOT CROWN

Season	Type of Treatment	Number Roots Treated	No. Roots Respr.	Per Cent Roots Respr.	Per Resprouting Root			Green Roots	Bushes Respr.	
					No. Stems	F.L.S.	No. Leaves		No.	Per Cent
North Exposure										
Spring	On Crown	80	2	2.5	1	1.10	38	13	2	8.0
	Off Crown	93	0	0	0	0	0	2	0	0
	Below Crown	103	0	0	0	0	0	0	0	0
Summer	Above Crown	76	7	9.2	3.3	1.06	17.4	15	7	28.0
	Through Crown	88	1	1.1	2.0	.30	9	3	1	4.0
	Below Crown	95	0	0	0	0	0	0	0	0
Fall	On Crown	78	14	17.9	1.9	.52	17.4	30	9	36.0
	Off Crown	84	3	3.6	1.7	.57	18.7	2	3	12.0
	below Crown	97	0	0	0	0	0	0	0	0
South Exposure										
Spring	On Crown	79	6	7.6	4.3	2.22	64.3	24	6	24.0
	Off Crown	85	2	2.4	1.5	1.00	12.5	1	1	4.0
	Below Crown	97	0	0	0	0	0	0	0	0
Summer	On Crown	74	15	20.3	4.3	2.21	59.2	6	12	48.0
	Off Crown	91	0	0	0	0	0	0	0	0
	Below Crown	106	0	0	0	0	0	0	0	0
Fall	On Crown	82	17	20.7	2.8	1.48	45.6	18	14	56.0
	Off Crown	89	0	0	0	0	0	0	0	0
	Below Crown	94	0	0	0	0	0	0	0	0

On crown: Roots cut leaving crown tissue attached

Off crown: Roots cut about one inch below crown

Below crown: Roots cut six inches in all directions from crown

The headings in table 7 show the number of roots treated, number of roots resprouting, per cent of total roots treated which have resprouted, number of roots with green cambium present but showing no evidence of resprouting and number and per cent of the 25 bushes decapitated for each treatment which have regenerated asexually from one or more resprouting roots. Number of roots are observed to increase as cutting treatments were extended away from the root-crown proper. This is because a class of small secondary feeder roots is encountered a short distance off the root-crown proper. Green roots are those still retaining normal appearing cambium but not resprouting.

The bulk of such roots is associated with the treatment of cutting primary roots from the root-crown proper and leaving a small portion of crown tissue attached. The per cent of total bushes treated has been calculated from the ratio of the number resprouting to the 25 bushes decapitated by each treatment.

The results of this study have shown that all resprouting was restricted to roots with definite root-crown tissue attached. This was true in all cases including the roots resprouting which had been cut from 1/2 to one inch below the root-crown. Cutting roots at least six inches in all directions from the root-crown proper resulted in no resprouting since such roots are well beyond the zone of demarkation between crown and root tissue. There is no need, therefore, of having crews search for and remove all small roots that have been broken off beyond the distance of six inches in all directions from the root-crown proper. Precautionary measures must be stated, however, in instructing crews to carefully remove all aerial portions of the bush and all supplemental root crowns which have originated asexually from rooted stems.

Resprouting of the total number of roots treated increased from the spring to fall series. Treatments on the north exposure resulted in eight per cent of the bushes resprouting for the spring series, 28 per cent for the summer series, and 36 per cent for the fall series. The same treatment on the south exposure resulted in 24 per cent of the bushes resprouting for the spring series, 48 per cent for the summer series and 56 per cent for the fall series. Danger from resprouting thus increases as the season advances. This is due to the fact that a bush in midsummer has had more time to manufacture reserve food, likewise a bush treated during the fall has more reserve food in store than a bush treated in midsummer. The stimulus for resprouting appears to be the quantity of reserve food the bush has stored in the roots and root-crown at the time the aerial portion is removed.

Considerably more resprouting occurred on the south exposure than on the north exposure. For the spring series of treatments 8 per cent of the roots resprouted on the north exposure and 24 per cent on the south. For the summer series 28 per cent of the bushes resprouted on the north exposure as against 48 per cent on the south. For the fall series of treatments 36 per cent of the bushes resprouted on the north exposure and 56 per cent on the south exposure. Ribes on the north exposure had long, trailing and few stems; large, thin and few leaves and roots somewhat shallow in comparison to those on the south exposure. Those on the south exposure had rather short, stout and many stems; somewhat small, thick and many leaves and deep penetrating roots. Bushes on the south exposure had the advantage of not only an earlier growing season but a longer day in terms of both intensity of light and hours of light for the manufacture of reserve food.

### III. LABORATORY AND GREENHOUSE WORK

The laboratory, greenhouse and ribes garden at Berkeley were actively maintained throughout 1943. In September arrangements were completed with the School of Forestry, Moscow, Idaho, for office, laboratory and greenhouse space to be occupied and used for disease and methods work by C. R. Stillinger

under the supervision of V. D. Moss. Greenhouse tests on the direct seeding of western white pine will be in progress early next year.

Special activities at Berkeley and Spokane during the year have included: (1) Germination tests on ribes and on western white pine and sugar pine seed, (2) Germination tests on poison oak seed and toxicity studies on the sterilizing action of boron on Camp Adair soils, (3) Greenhouse tests with sodium chlorosulfonate, ammonium sulfamate, and other chemicals, as possible herbicides for ribes eradication, (4) pH determinations on 27 samples of soil from Kaniksu light-moisture plots, (5) Chemical tests for identification of cankers on western white pine and sugar pine, (6) Determinations of moisture equivalent and wilting point percentages of 27 soil samples from the Kaniksu plots and of over 100 soil samples from problem areas in the Sugar Pine Region, (7) Construction of special apparatus for soils work and for wilting point tests by the barium nitrate equilibrium method, (8) Statistical analysis of field methods data from Idaho and of data from ribes and pine seed germination tests at Berkeley and at Spokane. Such 1943 data as are now available on the above topics are included in the following special reports which were prepared and made available to Blister Rust personnel during the calendar year of 1943:

Serial No. 116:

"Experimental Germination of Ribes Seeds." Series of 1942.  
.....C. R. Quick

Serial No. 117:

"Effects of Density of Planting on Growth in the Greenhouse of  
Ribes Roetzli Seedlings." .....C. R. Quick

Serial No. 118:

"Status Report on Reagents and Methods as Field Aids in Distinguishing  
Between Diseased and Normal White Pine Tissue and between Roots and  
Underground Stems of Ribes." .....H. R. Orford

Serial No. 119:

"The Effects of Ceanothus Cordulatus (Snowbrush) Seedlings on the  
Growth of Ribes Roetzli (Sierra Gooseberry) Seedlings."  
.....C. R. Quick

Serial No. 120:

"Experimental Germination of Ribes and Pine Seeds." Series of 1943.  
.....C. R. Quick

Spokane Office (Methods and Operations):

"Size of Crew, Width of Strip and Methods of Laying String."  
.....Virgil D. Moss (in cooperation with St. Joe operation)

Bureau MS No. 6835:

"Certain Methods of Forcing the Germination of Seeds." Journ. Calif.  
Hort. Soc., Vol. IV, 3:95-102. (1943)  
.....C. R. Quick

*This section is unreliable especially conclusions*

RESULTS OF INVESTIGATIONS ON THE WHITE PINE BLISTER RUST

By  
C. R. Stillinger, Pathologist

INTRODUCTION

The present report gives preliminary subject matter summaries of investigations of the various phases of the white pine blister rust which affect the application of control measures in the Inland Empire. This procedure has been adopted for the 1943 annual report in lieu of data obtained from the several field plots. The statements in this report are tentative, representing conclusions which are based on the analyses of data having been obtained during the past few years from plot studies, or from data issued by others.

BLISTER RUST CONDITIONS IN 1943

Rain during May and June of 1943 probably kept the aeciospores filtered out of the air so that there was very little opportunity for long distance spread from the pine to ribes. The presence of great masses of spores at the base of trees having large fruiting cankers indicated that a large part of the spores which had been liberated were washed to the ground by the rain instead of being carried away by the wind. However, on all plots where the ribes were inspected the per cent of the bushes and leaves infected was approximately the same in 1943 as in 1942. Since these bushes were all in fairly close proximity to fruiting cankers this was to be expected.

Although the 1943 season had more rain than 1942 and the rain was distributed at 10 to 14 day intervals, a climatic condition apparently favorable for the intensification of the rust on ribes, yet only 42 per cent as much rust was found per infected leaf as was found in 1943. Since climatic conditions appeared to be favorable for the intensification of the rust, but were unfavorable for the spread of the aeciospore, the decrease in the amount of the rust on ribes was probably due to the decrease in volume of the infection of the ribes by the aeciospores.

A rainy period prevailed from August 29th to September 3rd with almost continuous cloudy weather, but at that time the temperature was too low to be favorable for any great amount of pine infection to take place. Furthermore much of the telia had already germinated and as a result only a very small amount of inoculum was produced. Under these circumstances it is probable that very little pine infection took place.

PERIODS OF BLISTER RUST INTENSIFICATION

General observations as well as the results of some pine inspection on the permanent blister rust plots revealed that 1941 was a very favorable year for the intensification of the rust. Thus, since the introduction of the rust in 1923 in the Inland Empire white pine belt, periods of heavy intensification developed in 1927, 1933, 1937 and 1941. If this intensification continues at regular four-year intervals, at least, then we may expect another heavy wave in 1945.

## RATE OF INCREASE OF THE RUST

From an analysis of the rates of increase of the blister rust on forty plots well distributed over the Inland Empire white pine region the following tentative conclusions have been derived:

1. The rate at which the rust increases is the resultant of all the factors on a particular site which may have any influence upon the increase of the rust infection. For this reason it may be used as an index to the favorableness of the particular site for the development of the rust as well as a guide to the effectiveness of control in relation to the ribes population.
2. The rate of increase of the rust is the most satisfactory statistic which has been found for comparing the effectiveness of control on two or more areas.
3. A study of the curves obtained from the accumulative per cent of infection obtained for infection centers in the Inland Empire indicates that the white pine blister rust appears to act according to a biologic law which may be expressed by a mathematical curve. Comparing actual infection curves with that derived by means of the "logistic" and the third degree parabola revealed the fact that there was no significant difference between the curves for the actual infection and that calculated by means of the equations for either one of these curves. From a comparison of the standard errors of estimate the equation for the third degree parabola gave the closer approximation to the actual. Because of the much simpler calculations the equation for the logistic curve has been used in this study. For practical purposes Dr. S. B. Fracker prepared a semilogarithmic blister rust chart which reduces the curve to a straight line. If the accumulative per cent of infection is plotted on this chart, the rate of increase may be quickly determined and fairly accurate estimates made of the amount of rust present at the date of inspection.
4. In determining the accumulative per cent of infection from which the rate of increase can be determined it is necessary to determine the probable year each tree was first infected. It has been found that the easiest and most satisfactory way to do this is to use the age of the oldest wood bearing a canker as the year the tree was first infected. This will give an accumulative per cent within one year of the actual, that is, the apparent years of infection will be approximately one year earlier than the actual.

### INFLUENCE OF THE NUMBER OF RIBES, FEET OF LIVE STEM, AND NUMBER OF TREES PER ACRE UPON THE RATE OF INCREASE OF THE RUST AND UPON THE PER CENT OF INFECTION AT ANY PARTICULAR TIME

Since the rate of increase of the rust in a particular area represents the composite result of all factors, a study was made of the relationship between this rate of increase and the measurable factors, that is, the number of ribes, feet of live stem and the number of trees per acre. From this



study it was found that these factors together accounted for 51 per cent of the rate of increase of the rust, that the number of ribes per acre was of chief importance; that the number of trees per acre had little influence, and that feet of live stem showed no direct correlation with the rate of increase of the rust.

Another study was made correlating the same factors with the per cent of infection resulting (1) from the initial introduction of the rust, (2) at the end of four years, and (3) at the end of eight years. The results of this analysis indicated that there was no positive influence attributable to feet of live stem, that the number of trees was most influential in the introductory phase of the rust but that their importance decreased rapidly the longer the rust was present, and that the importance of the number of ribes increased very rapidly the longer time the rust was present.

#### AMOUNT OF PROBABLE INFECTION WHICH VARIOUS NUMBERS OF RIBES MAY PRODUCE IN A GIVEN TIME

Since the rust is generally past the introductory phase in the western white pine type and since, as previously indicated, the number of ribes per acre is the chief factor that can be controlled and becomes more important the longer the rust is present, a study was made of the importance of various numbers of ribes upon the rapidity at which the rust increases. In this study the rates of increase for an eight-year period were computed on forty plots distributed over northern Idaho. By comparing this rate of increase with the number of ribes present on each plot an equation was derived from the logistic curve in which the number of ribes per acre and the time in years could be substituted in order to obtain the amount of infection probable at any particular time. Comparing the curves computed by means of this equation for the specific number of ribes on a plot with the actual curves produced by the accumulative per cent of the infection for the individual plots, as well as comparing the data mathematically as an eight-year time series indicated that there was no significant difference between the actual and computed values. By means of this equation the data in table 1 were derived. The relationship indicated by these data is clearly shown in graph 1. Since the basic data were only for the first eight years of the presence of the rust on the plots, only that period on the graph can be considered reliable. However, extensions indicated by the dotted lines beyond the eight-year period were computed as a suggestion of what the theoretical trend might be. Also, the data probably represent the maximum which may be expected since the basic data were for plots apparently very favorable for the development of the rust.

Although these results are only tentative, the information is reliable enough to serve as a guide for our judgment on the relationship between the number of ribes and the amount of infection which may develop in a given time under favorable conditions. The greatest departure from the actual will be found in the per cent of rust developed in the introductory phase because of the wide variation in the number of trees which may be present on a particular area.

These data and the curves portray the ability of the blister rust to seriously damage a young white pine stand in a short time and indicate how rapidly and thoroughly the ribes must be eradicated if white pine reproduction is to be protected. Furthermore, until the ribes are finally reduced in numbers to the point where the regenerative vigor of white pine replaces the losses caused by the fungus, the principal result of the progressive ribes suppression is to increase the time required for the rust to cause major losses in the pine stand. Prompt suppression of the ribes is especially needed after the rust has become established, giving promise of the most effective results if done during the first four or five years after the rust has become established in the stand.

7 Another point of interest is the small difference between the curves for one bush and that for ten bushes. A probable explanation for this small difference may be in the fact that all bushes are not equally effective in taking, developing and distributing the rust. Possibly only one bush out of five or even out of ten is so located that it is a serious menace and the results obtained in reducing small populations of ribes depend more on what bushes are removed rather than how many. This suggests further that unless the ribes population can be reduced below one bush per acre serious consideration should be given to the question of whether an attempt should be made to reduce the ribes population much below ten ribes per acre.



GRAPH 1

Relation Between Number of Ribes and  
the Amount of Infection in a Given Time

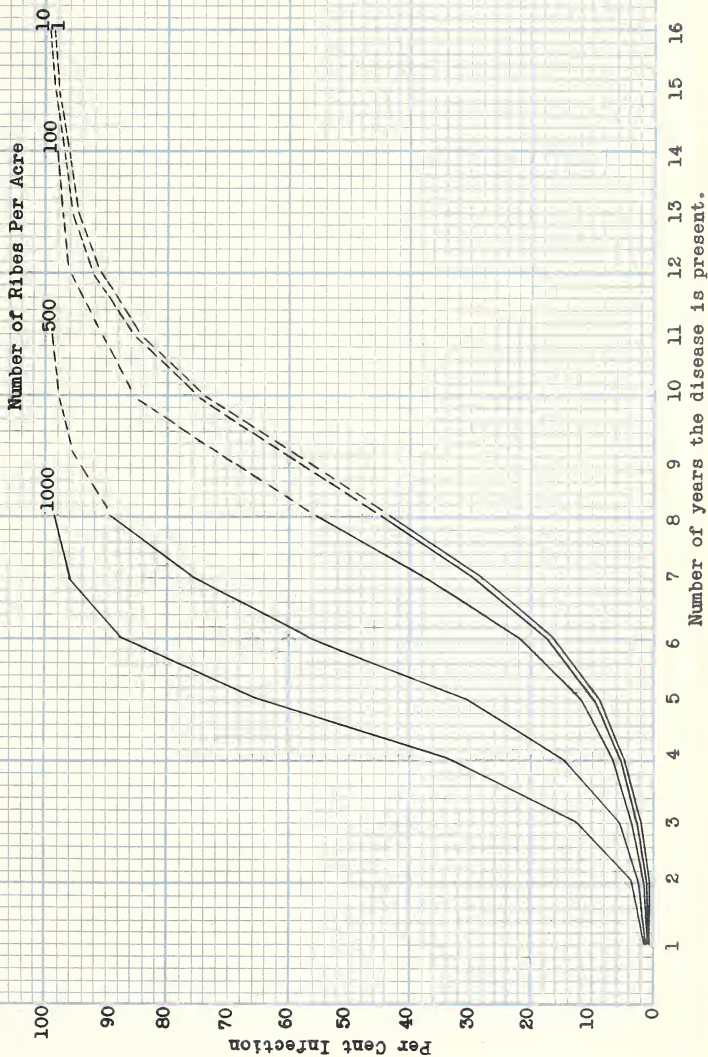




TABLE 1

PER CENT OF INFECTION PRODUCED BY A GIVEN NUMBER OF  
RIBES IN A GIVEN NUMBER OF YEARS

Number of Years	Number of Ribes Per Acre				
	1 Ribes	10 Ribes	100 Ribes	500 Ribes	1,000 Ribes
1	.73	.74	.76	.89	1.09
2	1.42	1.43	1.56	2.34	3.84
3	2.71	2.75	3.18	5.97	12.67
4	5.14	5.24	6.36	14.44	34.52
5	9.53	9.75	12.31	30.96	65.70
6	16.99	17.44	22.49	54.37	87.44
7	28.44	29.22	37.50	75.99	96.20
8	43.59	44.65	55.37	89.37	98.92
9	60.03	61.19	71.95	95.72	
10	74.48	75.50	84.14	98.34	
11	85.01	85.76	91.65	99.36	
12	91.68	92.17	95.78		
13	95.54	95.83	97.91		
14	97.65	97.83	98.98		
15	98.81	98.87			
16	99.37	99.42			

## TIMING OF ERADICATION

The timing of the removal of the ribes will largely determine the success or failure of the effort to protect reproduction and young pole from the destructive effects of the blister rust. It should be assumed that any site is favorable for the optimum development of the rust until experience with the rust on that particular site has shown that the site is not favorable. Since the aecia are probably introduced at random, the initial per cent of infection is small and depends more upon the number of trees per acre than upon the number of ribes per acre. There is a small increase in the rust during the first three or four years. By that time the cankers started by the initial introduction are producing abundant aecia, so that closely associated ribes become heavily infected. Then there is an enormous increase in the rust and during this damage stage the rate at which a young reproduction stand may be destroyed depends upon the number of ribes. For this reason the eradication work should be timed so that the ribes are removed previous to this period of intensification. If all the ribes are not removed, then the effect of the eradication is to temporarily break the close association between ribes and fruiting cankers, but as soon as a few ribes become closely associated with fruiting cankers the condition is set up for another heavy intensification of the rust. If this intensification is allowed to take place, little effect of the first eradication may be evident upon the increase of the rust. In several cases where eradication had been carried out and not followed at the proper time by a second eradication very little change was noted in the rate of intensification of the rust when data were transformed into the type of curve shown in graph 1.

As mentioned previously, blister rust thus far in this region has shown heavy intensification at four-year intervals. If it continues to intensify at about this regular interval instead of intensifying gradually each year, then on the seventh year after the introduction of the rust the serious damaging wave occurs which it is imperative to prevent. Therefore, it is necessary to know the history of the rust on each area and from this information determine when, how many and how rapidly the eradication measures must be applied. If it is not feasible to execute the necessary program, then the area should be abandoned especially if it is one in which young reproduction predominates, and more especially in the case of planted areas.

#### DISTANCE OF SPREAD - AECIA

The spread of the aeciospores of the blister rust is of importance to the control program only in so far as it is the means by which ribes are reinfected each year. Thus far a distance of spread of over 300 miles has been reported. Also aecia have been caught in spore traps each 1,000 feet up to 5,000 feet over heavily infected areas. A recent study of the pinon rust, the aecia of which are very similar to those of the white pine blister rust, revealed evidence of spread of aecia as far as 625 miles from the probable source. A spread much farther and higher than indicated must be expected in view of the known distance of spread of many types of spores. Because of the great volume of aecia now produced in the white pine of this region it is probable that under favorable spring weather conditions a considerable volume of aeciospores are showered over the entire region so that attempts to reduce the production of aecia locally by means of pruning out cankers do not give much promise of justifiable results.

#### DISTANCE OF SPREAD - SPORIDIA

The spread of the sporidia from ribes is the most important type of spread of any of the spore stages of blister rust because the distance of this spread determines the width of protection zone which must be freed from ribes if protection is to be established. The determination of the spread from individual bushes will indicate the number of ribes which may be left in a white pine stand without jeopardizing the crop of white pine timber.

A review of the recorded experiences with blister rust in both the United States and Europe indicates that the protection zone is and should be varied according to local conditions. Spread of the sporidia has been reported to be from 50 feet to one and one-half miles or more depending upon many factors. Following are the more important factors which must be taken into consideration in estimating probable spread: variation in the spread from year to year, the stage of intensification of the rust, susceptibility of the ribes, concentration of ribes, size of bushes, screening of the ribes and pine, topography and location of the ribes with reference to the white pine to be protected.

In determining the importance of the various factors previously mentioned present available information appears to substantiate the following statements:

1. The rust thus far has shown definite indications of intensification at four-year intervals rather than a gradual increase. On account of this the distance and volume of spread will vary from year to year depending upon these years of heavy intensification.
2. The stage of the intensification of the rust on pines will be associated with a corresponding increase in the volume of rust on the ribes. This, in turn, determines the volume of spores available and, consequently, a greater distance of spread of damaging infection.
3. Although the ribes species is often given considerable weight in judging probable distance of spread, in the Idaho white pine region each of the species important in the control program is capable and does produce such a volume of rust that the species of ribes present should be given much less weight than is given to the other factors.
4. Just how important concentration of ribes is depends upon their location and the nature of their environment. Concentrations of ribes are not necessarily an indication of the volume of rust present. The same number of bushes, if scattered, has the possibility of having more rust than those in concentrations because of the possible close association of each bush with a fruiting canker.
5. The size of the ribes does not appear to be an index to the amount of rust present. Their importance depends upon their location and environment. ?
6. Screening is one of the most important factors to be considered in estimating probable long distance spread. If the ribes are in heavy brush or a dense growth of trees the spread from them will be relatively small. On the other hand, if the ribes are in the open or growing above the surrounding vegetation or in any condition so that the full force of the wind can strike them, a much longer distance of spread may be expected. Screening does not give much protection to the white pine. Dense tree growth or trees in brush are in a better situation for infection due to the maintenance of more favorable moisture and temperature conditions for infection for a longer period than is maintained in the open.
7. Topography is an important factor in determining the direction of spread of the rust. As the slope increases in steepness a greater amount of the rust originating from the bush will be on the lower side of the bush. For this reason, bushes located at the bottom of a slope will not have the possibilities for as great a distance of spread of the rust as those at the top of the slope.
8. If the factors previously given are favorable for spread then ribes located above a stand of white pine represent a more serious threat to the pine than ribes located below the stand.

One or more of these factors may have such influence in nearly every situation that the standard rule in use for years of using 200-300 yards is apparently obsolete as far as being followed in actual practice. In this



region circumstantial evidence has indicated under some conditions a spread of the sporidia of one to two miles. Although other factors complicate the situations in each case, yet in view of the findings in other regions these suggested possibilities are not exceptional for the particular type of situation. In the various situations which arise carefully planned surveys should be made, if the facts regarding the situation are not already available, in order to arrive at a decision concerning the desirable protection zone for that area.

In this region it has been possible to obtain data on spread from individual or clumps of bushes, but not on various widths of protection zones because of the early stages of the control program. One method of approach has been to study the distance from infected pine to the nearest ribes on plots with scattered ribes. This method gives the minimum distance which the sporidia must have traveled and produced infection. It will not give the maximum distance because the infection on a particular pine may not have originated from the nearest ribes. Following are summaries of these studies:

On the Crystal Creek Plot 11 on the St. Joe operation the locations of all pine on the plot were recorded so that it was possible to study spread by one-foot zones within 25 feet of the ribes. In this case from the ribes to the edge of the 25-foot zone there was a gradual decrease amounting to about one fourth in the per cent of trees infected. The number of cankers per tree and number per infected tree were approximately the same for all zones.

On the Newman Lake Plot on the Mt. Spokane operation, it was possible to study the distribution of the infected trees and cankers by 25-foot zones for a distance of 200 feet from any ribes. In this case 75 per cent of the infected trees and 85 per cent of the cankers were in the first 100 feet from any ribes while the remaining 25 per cent of the infected trees and 15 per cent of the cankers were in the outer 100 feet, that is, were 100 feet or more from any ribes. On the other hand, taking the center zone with a 25-foot radius as a unit area and comparing this with similar sized areas in the successive 25-foot zones from a ribes showed that 61 per cent of the infected trees and 73 per cent of the cankers were in the 25-foot zone immediately surrounding the ribes. The remainder of the infected trees and cankers gradually decreased from the 50-foot zone with 14.5 and 12.6 per cent respectively, practically as a straight line to the outside zone, 175-200 feet, this latter zone having 2-1/2 per cent of the infected trees and one per cent of the cankers. The number of cankers per infected tree decreased from 2.8 in the first zone to one after the 100-foot zone.

On the Kalispell Creek plot 25 on the Kaniksu operation - a 1933 planting - a similar study to that of Newman Lake with a 200-foot limit was made. The distribution in this case was the result of a single wave of infection in 1937. In this case 53.3 per cent of the infected trees and 55.8 per cent of the cankers were in the first hundred feet. On a 25-foot unit zone comparison 42.7 per cent of the infected trees and 48.1 per cent of the cankers were in a 25-foot zone immediately around the ribes. The second unit zone had 20.5 per cent of the infected trees and 18.5 per cent of the cankers, these percentages decreasing in a linear relation to 3.2 and 2.6 in the last zone. The cankers per infected tree decreased from 1.3 in the first zone to 1.1 in

the 100-foot zone, averaging one canker per infected tree after that zone. This distribution was somewhat different from that for Newman Lake due to the more uniform distribution of the trees and the fact that only one wave of infection was represented.

The Powder House plot in the Clearwater operation presented the best opportunity to study spread of sporidia because of the size of the plot - approximately 90 acres - and because only a few well-distributed ribes were present. In this case the rust was introduced in 1933, then the ribes were eradicated in 1934, leaving scattered bushes. The ribes were generally in the open with, in the majority of cases, few pine within ten to fifteen feet of the bushes. Another wave of infection took place from these scattered ribes in 1937. The study of spread is based on this 1937 wave. Evidence of spread for at least 450 feet was shown by these data. Only 9.1 per cent of the infected trees were in the first 25-foot zone, this percentage gradually decreasing to .6 per cent in the 425-450 foot zone. The relation was linear. The distribution of the cankers showed 22.3 per cent in the first zone and ten per cent in the second 25-foot zone. Beyond the second zone the line gradually decreased following closely that for the infected trees. Since a circular acre has a radius of approximately 117 feet, then the acre immediately surrounding a ribes on the Powder House plot had 45 per cent of the infected trees and 55 per cent of the cankers. In other words, on this plot approximately one half of the infection from a single ribes took place on the acre immediately surrounding the bush while the remainder was well distributed for at least 350 feet beyond, an area of approximately 13.6 acres. Comparing similar sized areas in each zone shows that 47 per cent of the infected trees and 70.2 per cent of the cankers are in the first 25-foot zone. The second zone has 16 per cent of the infected trees and 10.5 per cent of the cankers. There is a gradual linear decrease from the second zone to the 425-450 zone, the latter having 0.1 per cent of the infected trees and .04 per cent of the cankers. The number of cankers per infected tree decreased from 3.3 in the first zone to 1.4 in the second zone gradually decreasing to one canker per infected tree.

On Kalispell Creek plot 24 on the Kaniksu operation, the conditions were somewhat different from any of the other plots. This area, planted to white pine in 1933, is largely open with only occasional brushy spots. The ribes are so distributed that a spread as great as 325 feet was found, that is, it was 650 feet in any direction to the nearest ribes. All of the infection is the result of an initial introductory wave in 1937 and local intensification has not occurred, as indicated by the fact that only ten per cent of the infected pine are in the 25-foot zone around the ribes and 6.2 per cent are in the outer zone 300-325 feet from any ribes. The distribution of the cankers is similar, 11.3 per cent in the first zone and 5.4 per cent in the outer zone. This type of distribution would appear to be the result of random distribution and suggests that the ribes had very little effect upon the distribution of the disease. However, a comparison of similar sized areas at various distances from the ribes indicates the influence of the ribes. In this case in the 25-foot zone surrounding the ribes were located 41.5 per cent of the infected trees, and 17.1 per cent were located on a similar sized area in the second 25-foot zone. Beyond this zone there is a gradual linear decrease to 1.2 per cent in the 300-325 zone. In the case of the cankers



48.2 per cent were in the first zone, 16.7 in the second zone, the per cent gradually decreasing in a linear manner until there is only one per cent of the cankers in the last zone. This shows the definite influence of the local ribes upon the distribution of the rust.

Near the Hanna Road on the Kaniksu operation two plots were established, each with a single clump of ribes in its center. A young stand of white pine is present in each cache, fairly well distributed over the area. During this last season the pine were inspected for five chains in all directions around these ribes. On the one plot which has about fifty per cent shade due to an overstory, 98 infected pines were found. On the other plot which has much less shade, 48 infected trees were found. The infection extended to the very edge of the area inspected in each case so that it will be necessary to extend the plots still further in order to determine the limits of the infection as well as to determine whether any other ribes are present besides the ones under study. Infected pine were found 420 feet from the ribes. This was all 1941 spread. In both cases, the infection extended largely in a strip running nearly east and west from the ribes. At the Hanna plot area the direction of the prevailing winds is along an east-west line.

Another group of data of value to this spread problem was obtained from a subplot on the Powder House area in the Clearwater operation. The study was made around Ribes viscosissimum bush No. 152, located on a dry northwest 10 per cent slope. The area was stocked with an average of 2,100 fifteen-year-old white pine per acre. There were no ribes on the slope above this bush and the nearest ribes down the slope were one 127 feet northwest and one 135 feet northeast. The inspection of these ribes in 1941 revealed no rust on the bush 135 feet away and 1.15 square inches of rust on the other, while bush No. 152 had 24.58 square inches of rust. Regarding two other bushes 3 and 3-1/4 chains away in 1941 one was not infected and the other had .24 square inches of infection. In view of these facts it appeared that very probably a large part of any infection which had developed in 1941 on the pine around bush No. 152 probably came from that particular bush.

Since this situation offered an opportunity to learn the probable infecting power of a single ribes, all pine within 90 feet of the bush were inspected. From the analysis of these data the following information was obtained:

1. Three waves of infection were present, 1933, 1937 and 1941. Very little infection appeared during years other than those just given.
2. A total of 1,266 trees were inspected. Fifty-six per cent of these were infected. Grouping the data into 10-foot zones from the bush, 100 per cent of the trees were infected in the first 10-foot zone, this percentage gradually decreasing to 43 per cent in the 80-90 foot zone.
3. The 709 infected trees were first infected as follows: 24 in 1933, 242 in 1937 and 443 in 1941.
4. Considering new and repeat infection the following number of trees were infected by each wave; 24 in 1933, 255 in 1937 and 640 in 1941.

5. The probable origin of the 6,050 cankers was as follows: 24 in 1933, 437 in 1937 and 5,589 in 1941.

6. Although the plot was on a gentle slope - about 10 per cent - yet there was a definite difference in the amount of infection and number of cankers on the upper and lower side of the bush beyond the ten-foot zone. For instance in the 10-20 foot zone, on the upper side 75.8 per cent of the trees were infected and there was an average of 8.9 cankers per tree while on the lower side 84.6 per cent of the trees were infected with an average of 44.4 cankers per tree. This difference was more evident in the 80-90 foot zone. Above the ribs 20.4 per cent of the trees were infected with an average of .2 cankers per tree. Below the bush in this zone 51 per cent of the trees were infected with an average of 1.1 cankers per tree.

7. Approximately 75-86 per cent of the infected trees will be killed by the infection which was found.

8. Blister rust distributed largely from this one bush will destroy this pine stand on the acre immediately surrounding the bush and will cause serious damage over a considerably greater area as indicated by the fact that 43 per cent of the trees are infected in the outer ten-foot zone. The data from the other plots indicate that serious infection from this ribs may extend out 300-400 feet from this bush.

#### INFLUENCE OF OVERSTORY UPON THE DEVELOPMENT OF THE RUST ON THE CLEARWATER OPERATION

Hollywood plot 9 on the Clearwater operation was established in 1938 on an area which had been logged in 1934. An overstory of white pine was left consisting of white pine 100-150 feet tall. Reproduction established itself in various degrees of stocking over the area, averaging approximately 5,000 white pine per acre, nearly free from other species of trees. The ribs were eradicated in 1933 before logging. When the plot was established, an average of 34 ribs per acre was found, irregularly distributed over the plot of 6.4 acres. In 1938 and 1939 most of the ribs were infected, a great many quite heavily. This was unusual since no fruiting cankers were found on the young white pine, consequently, it appeared probable that some fruiting cankers must be present in the overstory.

This supposition was verified in 1943 by the examination of some of the trees from the overstory which were blown over or had their tops broken out by heavy snow and ice. Thirteen trees were examined. Infection was found in six of the trees. In three cases the rust was either in the trunk or will surely reach the trunk. The infection was 40 to 100 feet from the ground in the corymb-like crowns of the trees. Some of the infection originated in 1927 and 1933 but most of the infection was of 1937 origin. Nearly all the cankers had produced aecia several times.

These facts indicate that, due to the fruiting cankers in the overstory, that is, those originating in 1927 and 1933, the ribs in the immediate vicinity were consistently more generally and heavily infected than they would have been from aecia which had traveled for some distance. Certainly, the

ribes would not have shown the annual heavy infection if the spores had been coming from remote cankers because of the influence of seasonal conditions on the effective long distance spread of the aecia. Under such conditions the rate of increase of the rust was speeded up about four years over that which would be expected. This means that on partially logged areas where the overstory might contain cankers in order to protect the white pine from the rust the ribes must be eradicated immediately and thoroughly approximately four years earlier than normally. Of course, if the area is uniformly stocked with 5,000 trees per acre the situation will not be so serious but since many parts of this area had much fewer pine per acre, the stocking will be greatly reduced in many places.

The further fact should be noted that there was some infection originating in 1937 in the overstory, very evidently from the ribes below and that some of this infection will be damaging. In this case 50 per cent of the trees will be damaged, but this is not necessarily a general damage possibility because the sample in this case was very small. Additional studies should be made by felling trees, if necessary, in order to obtain more information of this nature. Such inspections should be made in May or June during the period of aecial production, otherwise many cankers will be missed due to the obscuring of the symptoms in the older, slow-growing branches.

#### THE IMPORTANCE OF RIBES LACUSTRE IN THE CONTROL OF BLISTER RUST

A thorough study has been made of all of the information available regarding R. lacustre and its importance in the control of white pine blister rust in the Inland Empire. As a result of this study, the following conclusions seem to be justified:

1. R. lacustre is the most widely distributed and is found in a greater variety of ecological habitats than any other species of ribes.
2. The low susceptibility of R. lacustre has been indicated several times. This has been one of the reasons for considering this ribes of lesser importance compared to other species.
3. R. lacustre can be the agent not only for the establishment of the rust but may be the source of enough rust to cause rapid intensification in white pine and consequently cause serious damage to white pine.
4. Small bushes of R. lacustre represent a greater menace to white pine than their size indicates. The size of a bush is no indication of the amount of rust which it is apt to carry.
5. The volume of rust on a ribes is much more dependent upon the amount of shade and/or the nearness of a fruiting canker than upon the susceptibility of the ribes species to the rust.
6. Because of the growth habit and brittleness of the crown, especially in the late summer and fall, as well as the ease of layering, it appears to be one of the most difficult upland species to eradicate. This is confirmed

by the fact that in most areas with mixed populations of ribes, as successive eradications progress, there is a gradual increase in the proportion of R. lacustre to other species, many times terminating in an almost pure population of this species.

7. All the data indicate that R. lacustre produces enough rust to cause serious damage to white pine, consequently, it must be thoroughly and completely eradicated and an area should not be given deferred priority because of the fact that R. lacustre is the only ribes species present.



## PHOTOGRAPHIC AND EDUCATIONAL WORK, 1943

By

Frank O. Walters, Assistant Regional Leader

H. Miller Cowling, Scientific Aid

The year 1943 represented a considerable curtailment of the photographic and educational work, only the more essential elements of the work receiving attention.

In addition to the work of this region the photographic section provided services for the Sugar Pine Region and the Pear Psylla Control.

The various members of the technical staff participated in the educational phase of the work by showing motion pictures, giving lectures and providing information and literature to the various camps.

### A. Photographic Section

The major objectives of this section are: (1) The maintenance of a pictorial record of control and investigative work, (2) the supplying of photographs, charts, maps and manuals for facilitating the field work, and (3) the production of material for educational purposes. The amount of work performed under items (1) and (2) was considerably reduced this year.

All the work during 1943 was reduced to a minimum. The Multilith machine and the black-line printer turned out the most material. The greatest volume was produced for the office of Pear Psylla Control.

Throughout the year the mimeograph machine was in use for the production of small temporary forms, bulletins, and the body of this report. Operation of this machine was handled chiefly by the stenographic personnel. No work was done for Pear Psylla Control on this machine.

The importance of series pictures (rephotographing the same areas yearly) has made this phase of the field photography a major field project. Two illustrations of series pictures are used in this year's annual report. Colored photography was continued on a restricted basis, being used only on series pictures.

The summary of reproduction work by photographic and machine methods for 1943 is given in the following table:

PHOTOGRAPHIC, MULTILITH, BLACK-LINE AND MIMEOGRAPH WORK

Item	North- western Region	Sugar Pine Region	Pear Psylla Control	Total
PHOTOGRAPHIC				
Lantern slides, natural color	84			84
Films, developed, field films	102		11	113
Copies, 5x7	42		51	93
8x10	51		11	62
Printing, 4x5 or smaller		202	120	322
5x7	344		60	404
8x10	12			12
9x11	200		520	720
Enlarging, 11x14 or smaller	6		4	10
16x20	10	14	21	45
20x24	44			44
on 5x7 film			13	13
Total Items	895	216	811	1,922
MULTILITH				
Copies	52	33	60	151
Plates made	91	79	49	219
Cards printed	2,500		93,500	96,000
Cards oriented, reverse	1,000		93,500	94,500
Total cards	3,500		187,000	190,500
Paper printed	8,000	9,500	35,500	53,000
Paper printed, reverse	3,500	7,000	6,000	16,500
Total paper	11,500	16,500	41,500	69,500
Total Items	15,149	16,612	228,609	260,370
BLACK-LINE PRINTER				
Total maps, printed	529		1,728	2,257
MIMEOGRAPH				
Total paper	13,140			13,140
Grand Total All Items	29,713	16,828	231,148	277,689



## B. Educational Section

Additional motion pictures were taken of the Priest River log drive in order to improve that portion of the logging sequence in the western blister rust film.

Good demonstrative and educational use is now being made of the several photographic series depicting progressive white pine regeneration, growth and development over a period of years. These series have attracted much interest and have been widely circulated.

A photographic album has been prepared to graphically illustrate the various phases of the work and methods used.

1. Bulletins and posters. Bulletins and literature dealing with blister rust were made available to all employees engaged on blister rust control during the past season. Posters were displayed in the various camps.

All requests for printed information received at this office were filled.

2. Talks, slides and motion pictures. Particular effort was made to acquaint the temporary employees with the problems and techniques of the job through the medium of lectures, camp meetings and continual on-the-job education to stimulate their own interest and to enable them to impart intelligent information to those whom they contacted in their home communities.

Due to war restrictions no fairs or exhibits are being held. Formerly slides and motion picture showings were made at these gatherings. As a consequence the scope of this type of educational work has been greatly reduced. Eleven showings of the western motion picture were made before 545 people.

A reprint of a series of pictures of white pine regeneration made over the last ten years appeared in the November issue of the American Forests.











ANNUAL REPORT  
of  
WHITE PINE BLISTER RUST CONTROL  
in the  
SUGAR PINE REGION

CALENDAR YEAR 1943

\* \* \* \* \*

UNITED STATES DEPARTMENT OF AGRICULTURE  
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Cooperating with

1. United States Forest Service
2. National Park Service
3. Oregon and California Revested Lands  
Administration
4. State of California
5. Michigan-California Lumber Company
6. Diamond Match Company
7. Red River Lumber Company

Compiled:  
Sugar Pine Regional Office  
Blister Rust Control  
610 Syndicate Building  
Oakland 12, California





### FOREWORD

The aim of the blister rust control program in the Sugar Pine Region for the duration of the war is to maintain protection of areas on which work has already been started and to attempt to hold the rust in check through directing all ribes eradication to spots of high rust hazard and destroying all known pine infections until sufficient funds and labor are available to maintain a larger program.

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## WHITE PINE BLISTER RUST CONTROL IN THE SUGAR PINE REGION

## ANNUAL REPORT FOR 1943

## PART I

GENERAL SUMMARY

By

Warren V. Benedict, Regional Leader

During 1943 the Sugar Pine Regional office of the Bureau of Entomology and Plant Quarantine cooperated with Regions 5 and 6 of the United States Forest Service, Region 4 of the National Park Service, the Oregon and California Revested Lands Administration, the States of California and Oregon, and the Michigan-California, Diamond Match, and Red River Lumber Companies in providing technical direction and planning of blister rust control work. This included the location and designation of work areas for 16 camps and 625 workers on national forest lands, 4 camps and 160 workers on national park lands, 4 camps and 80 workers on O and C revested lands, and 8 camps and 325 workers on state and private lands. Throughout the season technical direction, training of field crews, and checking of work areas were maintained to secure proper eradication methods and effective control standards.

Accomplishments of the several agencies during 1943 as well as the accumulated results of control work from its inception in the Region through 1943 are shown in the following tables:

TABLE 1

SUMMARY OF ACCOMPLISHMENTS DURING 1943

Agency	Expenditures	Acreage Worked		Number of Ribes Destroyed	No. Effec. 8-Hour Man Days Expended
		Initial Eradication	Re-eradication		
Forest Service	\$309,920	11,974	21,744	3,633,846	26,896
Oregon and California Revested Lands Administration	36,112	6,167	-	129,538	2,307
National Park Service	89,276	2,496	4,697	888,387	7,385
Subtotal (Fed.)	435,308	20,637	26,441	4,651,771	36,588
EPQ*	120,525	9,627	7,889	2,221,277	13,527
Total	\$555,833	30,264	34,330	6,873,043	50,115

\*Cooperative work by the Bureau of Entomology and Plant Quarantine on state and private lands.

Of the 33,718 acres worked in 1943 by the Forest Service, 15,624 acres were intermingled lands of other than national forest ownership, mostly private, worked of necessity to protect national forest lands; likewise, of the 6,167 acres worked by the O and C Revested Lands Administration, 2,815 acres were intermingled lands in other ownership, largely Forest Service; of the 7,193 acres worked by the National Park Service, 15 acres were intermingled private lands; and of the 17,516 acres worked by Bureau cooperative camps, 2,815 acres were intermingled federal lands.

TABLE 2

STATUS OF RIBES ERADICATION WORK BY LAND OWNERSHIP  
AS OF DECEMBER 31, 1943

Land Ownership	Acreage of Pine in Control Units	Acres Worked		Number of Ribes Destroyed	Effective 8-Hour Man Days Expended
		Initial Eradication	Re-eradication		
National Forest Lands	1,109,399	369,865	210,048	82,362,393	377,292
O and C Revested Lands	129,709	37,596	-	690,717	9,608
National Park Lands	247,302	88,023	13,244	18,025,651	122,026
Subtotal (Federal)	1,486,410	495,484	233,292	101,078,761	508,926
State and Private Lands	1,044,910	433,370	168,126	61,112,824	311,332
Total	2,531,320	928,854	391,418	162,191,585	820,258

As of December 31, 1943 the job of initial ribes eradication was 36 per cent completed and the overall eradication jobs needed to establish control, that is the initial job plus such subsequent reeradication necessary to suppress ribes permanently, was about 20 per cent completed.

Because of the intermingled pattern of ownership prevailing in the Sugar Pine Region, it is impracticable for an agency consistently to work only its own holdings. Moreover, land ownership is not stable and the periodic exchange of lands, particularly from private into national forest ownership, makes necessary a periodic revision of data by ownership. Therefore it is necessary each year for the Forest Service to work some interspersed private or O and C revested lands, and the Bureau cooperative operation to work some interspersed federal lands. In general work units are laid out to make these exchanges as compensating as possible. In recent years the Forest Service has worked more interspersed private land than has the Bureau of interspersed federal lands. Transfer of private land into national forest ownership has, however, more than offset this difference. Practically all lands worked by the National Park Service are national park lands.

TABLE 3

TOTAL EXPENDITURES BY AGENCIES AS OF DECEMBER 31, 19

Agency	Type of Funds	Amount	Total Expenditure
Forest Service	Regular	\$ 1,103,940	\$ 2,110,250
	WPA	509,542	
	CCC	219,841	
	PWA	276,927	
Oregon and Calif. Revested Lands Administration	Regular	88,119	88,119
National Park Service	Regular	208,540	407,253
	CCC	198,713	
*EPQ	Regular	1,176,424	4,020,041
	WPA (Fed.)	2,334,500	
	WPA (State)	20,666	
	PWA	485,945	
	NYA	\$ 2,506	
Total Federal			6,625,663
State of California			59,668
Private Lumber Companies			5,900
Grand Total Expenditures			\$ 6,691,231

Information shown in Table 1 represents accomplishments by agency, whereas that for Table 2 represents accomplishments to date for existing ownerships. Table 3 reports total expenditures to date for blister rust control work in the Sugar Pine Region by agency.

As was the case for all non-military agencies along the West Coast, blister rust control work was handicapped to a great degree by conditions resulting from the war emergency. The intensive war activities in the region caused an acute labor shortage as well as a scarcity of many equipment and supply items. The various restrictive orders and regulations resulting from these shortages, such as food and gasoline rationing, priority ratings, labor and wage stabilization policies increased manifoldly the problems of operating a seasonal field project. Due to the general scarcity of labor in the forest areas or its employment on urgent war projects, it was necessary to use blister rust crews to an abnormal extent on fire suppression work. Roughly one quarter of the short operating season was spent by blister rust crews fighting forest fires.

\*EPQ expenditures include those made prior to 1934 when the blister rust activity was under the Bureau of Plant Industry, work done by those Bureaus on both federal and private lands before the enactment of the Federal Lea Act in 1940 when the cooperative project for working state and private lands was inaugurated, and expenditures by them before fiscal year 1942 for such activities other than ribes eradication, as scouting for blister rust, pine reconnaissance, and black currant eradication.

Other effect of the war has been the sharp increase in logging of sugar pine timber on lands of all ownerships, particularly private holdings, to meet heavy demands for this specialty wood. Since logging brings about conditions favorable to the germination and growth of ribes, the result of this accelerated cutting has been to increase the acreage of lands in the cut over category far more rapidly than can be treated opportunely under the present control program. Such lands to be handled most economically should be worked within three or four years after logging to remove the new bushes before they have a chance to produce their usual abundant annual seed crops normally appearing after that age. The rust hazard is also increased by the presence of many new ribes in association with the young pines.

As a result of the payment of high wages and the general high cost of materials, the cost of the 1943 work was 11 per cent higher than the work of the previous year, or \$11.09 per effective man day as against \$10.51 in 1942.

Field operations were adjusted to meet war conditions by using labor outside draft age and not required by war industries or agriculture, namely through the use of 16 and 17-year old school boys and to a limited extent convicts. The use of new equipment and supplies was restricted to bare essentials. Work objectives for 1943, were directed, first, to care for the necessary reeradication on lands worked previously and on which ribes were regenerating, thus to safeguard the investment already made in control, and, second, to retard rust development by eliminating pine infection centers and concentrating ribes eradication work in areas of abundant ribes of high rust hazard where the disease generally first becomes established and in which it develops most rapidly. This objective will be continued while the scope of the work is sharply curtailed by the war emergency.

Although the productivity and general efficiency of the 16 and 17-year old boys and convicts employed during 1943 was definitely sub-standard, nonetheless through their use effective progress was made toward meeting the minimum control objectives mentioned above.

No important extension of blister rust infection occurred during 1943. Infection on ribes was found for the first time on the Tahoe National Forest, which extends the known spread of the rust a few miles southward in the commercial sugar pine belt. Rust on ribes was also found in Marin County along the California coast, bringing the rust close to the San Francisco Bay Region.

Within this area of general spread there has developed a number of infection centers. A careful search was made for them in all control units and wherever found the pine infections were destroyed and ribes eradicated from the surrounding territory. The purpose of this work is to retard rust build-up and delay its development as much as possible pending the time when a ribes eradication program sufficient in scope to keep abreast of the overall needs of the job can be placed in the field. In all some 23,405 pine cankers were destroyed during 1943.

A detailed description of the various work projects undertaken during the year will be found in the reports that follow.



LEADERSHIP, COORDINATION, AND TECHNICAL DIRECTION  
OF BLISTER RUST CONTROL  
BY THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Work Project BLR-1-5

By

Thomas H. Harris, Forester, P-4

OBJECTIVES

In the Federal program of blister rust control, work is conducted by several Federal agencies each on the land within its jurisdiction. To correlate these projects and to centralize planning and technical advice for privately initiated as well as governmental work, Congress\* has invested the Bureau of Entomology and Plant Quarantine with responsibility for the leadership, the coordination, and the technical direction of all control work.

ORGANIZATION

The regional headquarters of the Bureau at Oakland, California, continued to carry out as in previous years the purposes of this project through its technical staff. In consultation with the cooperating agencies plans for control work for the season of 1943 were devised, advice given in pathological and practical control problems, and the various programs related one to another. The personnel of the Oakland office and their assignments are given below.

Staff of the Oakland Office in 1943

\* \* \* \* \*

\* Members of the staff learned with the deepest sorrow of the \*  
\* death of Ensign Glenn J. Taylor while in the service of his \*  
\* country in the Pacific Theater on March 30, 1943. Formerly \*  
\* checking supervisor on the Stanislaus Operation, Glenn re- \*  
\* ceived his commission in the United States Naval Reserve on \*  
\* March 6, 1942. After a few weeks' training in the San \*  
\* Francisco Bay Region he was sent to the Hawaiian Islands, \*  
\* where he remained in active duty in aerial reconnaissance \*  
\* until his death. He is survived by his widow, Mrs. Jessie \*  
\* Gray Taylor of Oakland, and by his parents Mr. and Mrs. Glenn \*  
\* E. Taylor of Long Beach, California. \*  
\* \*  
\* Glenn was one of the most congenial of our staff. His clean \*  
\* habits, sincerity, straightforward dealing, and uprightness \*  
\* set him apart from the average man and marked him as one \*  
\* whose friendship was a privilege. We are proud to have had \*  
\* him as one of us. \*  
\* \* \* \* \*

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\*In the Lea Act, entitled "For forest protection against the white pine blister rust," approved April 26, 1940; Public 486, 76th Congress, Chapter 159, Third Session, 54th Statute 168,169.

Warren V. Benedict, Forester, P-5.....Regional Leader in Charge  
Thomas H. Harris, Forester, P-4.....Assistant Regional Leader

### Control Operations

#### a. Oregon and Klamath National Forest of California

Douglas R. Miller, Forester, P-3.....Technical Supervisor  
Lyle N. Anderson, Agent, P-2.....Assistant Technical Supervisor  
Lawrence P. Winslow, Agent, P-2.....On loan by the Methods Project

#### b. Lassen and Plumas Operations, Lassen Volcanic National Park

Benton Howard, Forester, P-3.....Operation Supervisor  
S. Daryl Adams, Agent, P-2.....Checking Supervisor (com-  
missioned Lieutenant (j.g.)  
U. S. Naval Reserve, 4/1/43)  
E. Ross Ellis, Agent, P-2.....Checking Supervisor

#### c. Eldorado Operation

Robert Sovulewski, Agent, P-3.....Operation Supervisor  
Warren S. Burrill, Forester, P-2.....Checking Supervisor (appointed  
September 10, 1943)

#### d. Stanislaus Operation

Carl W. Fowler, Forester, P-3.....Operation Supervisor

#### e. Sierra National Forest, Yosemite, Kings Canyon, and Sequoia National Parks

Frank A. Patty, Pathologist, P-3.....Operation Supervisor  
John N. Mitchell, Forester, P-2.....Checking Supervisor

### Scouting and Disease Surveys

Douglas R. Miller, Forester, P-3.....Project Leader

### Business Administration

Ralph H. Simons.....Administrative Assistant, CAF-9  
Orvis R. Decious.....Clerk, CAF-6  
Rose E. Stayton.....Clerk-Stenographer, CAF-4  
(resigned March 4, 1943)  
Loa H. Smith.....Clerk-Stenographer, CAF-4  
Juliana Arca.....Clerk-Stenographer, CAF-4  
Marion A. Owen.....Clerk-Typist, CAF-3  
Aretta D. Miller.....Clerk-Stenographer, CAF-3  
(appointed by transfer from U. S.  
Forest Service, May 17, 1943)  
Jean M. Rodrigues.....Clerk-Typist, CAF-2 (appointed  
July 6, 1943)  
Phyllis A. Verutti.....Clerk-Typist, CAF-2 (appointed  
March 2, 1943)  
Richard F. Leahy.....Agent, SP-6, Warehouse Foreman

Berkeley Office: Developmental Work in Control Methods

Harold R. Offord.....Pathologist, P-4, In Charge  
Clarence R. Quick.....Forest Ecologist, P-3  
Lawrence P. Winslow.....Agent, P-2  
Catherine Ryan.....Clerk-Stenographer, CAF-3

Rates of Pay

Wage rates for laborers for the 1943 season were standardized on a monthly basis by all agencies at such rates that crewmen netted after board deductions about \$100. Basic salaries paid supervisory personnel remained essentially the same as in 1942. All wages and salaries were subject to the 21.6 per cent increase stipulated by Federal law to compensate for overtime work. A listing of the rates paid by the Bureau follows:

Bureau Wage Rates for Seasonal Blister Rust Control Workers, 1943

<u>Pay Roll Title</u>	<u>Field Title</u>	<u>Monthly Base Pay</u>	<u>Monthly Overtime Allowance</u>	<u>Gross Pay</u>
Sr. Field Supv., SP-7	Camp Supt.	\$191.66	\$41.52	\$233.18
Field Supv., SP-6	Camp Foreman (small camp)	166.66	36.10	202.76
Asst. Field Supv., SP-5	Asst. Campboss	150.00	32.50	182.50
Prin. Inspector, SP-7	Checker Foreman	191.66	41.52	233.18
Sr. Inspector, SP-6	Senior Checker	166.66	36.10	202.76
Inspector, SP-5	Junior Checker	150.00	32.50	182.50
Cook, Unallocated (large camp)	First Cook	175.00	37.90	212.90
Cook, Unallocated	Second Cook	135.00	29.24	164.24
Laborer, Semi-skilled	Crewleader, part-time truck driver	135.00	29.24	164.24
Laborer, Unskilled	Laborer, crewman, kitchen helper	120.00	26.00	146.00

Board deductions by the Bureau were \$1.41 per day.

WORK PERFORMED

Leadership and Coordination

The Bureau continued to uphold its responsibilities for correlating the activities of the agencies, public and private, that engaged in blister rust control work in 1943. The technical staff cooperated in the preparation of control plans for the individual projects, provided information for the solution of pathological problems, and gave technical direction to the field programs.

The agencies that engaged in control work in the Region are listed on the next page.



1. Agencies engaged in control work.

a. United States Department of Agriculture

- (1) \*Bureau of Entomology and Plant Quarantine
- (2) Forest Service

b. United States Department of the Interior

- (1) National Park Service
- (2) Oregon and California Revested Lands Administration

c. \*State of California (Division of Forestry, Department of Natural Resources)

d. \*Diamond Match Company

e. \*Red River Lumber Company

f. \*Michigan-California Lumber Company

2. Agencies contributing facilities and services under Memoranda of Agreement with Bureau of Entomology and Plant Quarantine.

a. State of California

- (1) Division of Forestry, Department of Natural Resources
- (2) Department of Agriculture
- (3) College of Agriculture, University of California
- (4) Botanical Garden, University of California

b. State of Oregon

- (1) Oregon State Board of Forestry
- (2) Division of Plant Industry, Department of Agriculture

Again signifying its desire to participate in the cooperative ribes eradication project on State and Private lands, the State of California in April appropriated \$100,000 for the biennium July 1, 1943 to June 30, 1945. The appropriation carried the stipulation that any sums expended shall be matched with Federal money. Part of this money was deposited with the Treasurer of the United States and helped finance cooperative control work at the beginning of fiscal year 1944 (see Part III). Relations between the interested departments of the State and the Bureau continued to be governed by the Memorandum of Agreement of January 1942, the specific amount of cooperation for fiscal year 1944 being set forth in signed statements called "Certification of Funds". To cover the use of Bureau employees by the State of California in the emergency suppression of forest fires, a new "Cooperative Fire Protection Agreement" was executed by the Bureau and the State Division of Forestry, Department of Natural Resources, and approved July 19, 1943.

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\*Participated in cooperative ribes eradication on State and private lands in California.

Three lumber companies in California also continued to participate financially in the control program on State and private lands. The Memoranda of Agreement between the Bureau and the Michigan-California Lumber Company, the Red River Lumber Company, and the Diamond Match Company were renewed for the fiscal year of 1944, and each company contributed \$2,000 in cash with the understanding that a similar amount would be expended by the Federal government.

Superseding the agreement that expired on June 30, 1943, a new Memorandum of Understanding between the Forest Service, Region 6, and the Bureau was signed on May 4. The new agreement runs indefinitely or until cancelled in writing by either party. To define the relations and responsibilities of the Bureau and Lassen Volcanic National Park with respect to control work in the Park, a Memorandum of Understanding was drawn between the two parties, becoming effective May 22, 1943. This agreement likewise does not require annual renewal. Cooperative relations with other national parks and with the Forest Service, Region 5, continued to be governed by existing memoranda.

The agencies engaging in forest protective work recognized early in the year from the severe scarcity of labor that collective effort would be necessary to recruit the large number of workers needed for fire suppression, blister rust control, and other essential forest activities. A common recruiting plan was dictated hardly more by the need than by the desire to avoid disastrous competition among themselves in a shrinking labor market and unwarranted duplication of recruiting facilities. Accordingly, the Division of Forestry of the State of California, the National Park Service, the Forest Service, Region 5, and the Bureau in a series of conferences devised a joint recruiting program for California in which each agency had specific responsibilities. The State was divided into districts and an organization composed of representatives of the agencies was established to operate in each. The Forest Service and the State Division of Forestry collaborating recruited largely in the mountain and Central Valley districts and in Southern California; in Sacramento they were assisted by the Bureau; the Forest Service was assigned San Francisco, and the Bureau recruited principally in the East Bay counties and in Marin County. In each district applicants were received for all types of work and were referred to the proper agency. A similar program was adopted by establishments operating in Oregon.

Of necessity attention was concentrated on 16 and 17-year old high school students inasmuch as older and other types of labor were practically non-existent, such was the wartime demand for labor in the industrial and agricultural regions of California. Experienced former employees were very few. Many school teachers were hired for supervisory positions, and some of these recruited groups of their students. The combination of a teacher and his students proved to be a stable labor group, usually giving superior service. As a result of the collective recruiting about 3,000 persons, predominantly students, were employed, and the needs of all employers in forest protection were satisfied.

Under an agreement with the California State Board of Prison Directors, the Forest Service, Region 5, worked about 200 inmates of San Quentin and Folsom Prisons on blister rust control. These were quartered in regular camps operated jointly by the Forest Service and the State Board of Prison Directors (see Part IV). Under an arrangement with the Forest Service the Bureau operated one camp of prison inmates on the Plumas National Forest.

## Technical Direction of Ribes Eradication

Technical direction again was afforded the field programs of the cooperating agencies through the Bureau's operation supervisors stationed in various national forests and parks. Control plans were made, field work inspected, standards of work established, preliminary surveys made, and advice on special problems given.

Spot working, now accepted as a part of standard ribes eradication practice, was applied widely on the Plumas and Lassen Forests and less extensively on the Klamath Forest. By this method areas of considerable size were given partial protection that otherwise would not have been reached for several years in the normal course of complete upland eradication. For further treatment of this subject see Parts III and IV of this report and page 10 of the Annual Report for 1942.

One of the circumstances that vitally affected the quantity and quality of ribes eradication was the youthfulness of the labor and its extreme inexperience in woods work, and even in work of any kind. Needless to say, this was a handicap. Particular attention had to be given to the training and conditioning of the boys, who could not be expected to accomplish as much hard physical work as older age groups. The quality of the work was also inferior to that attained in previous years, and was due largely to youthful inattention, immaturity, propensity to play, and general inexperience. Accidents and juvenile diseases also reduced the effectiveness of the boys. In spite of these disadvantages a creditable amount of very necessary work was accomplished with an efficiency not greatly less than that obtained in 1942 when college labor was used.

Prison labor, too, posed special problems. To the complete inexperience of inmates was added physical softness, indifference, and unfavorable public sentiment. Prison labor was most effective on initial ribes eradication in dense populations, as at Jawbone Creek on the Stanislaus, and less effective on reeradication. As with student labor, the quality of its work was not equal to that of labor formerly employed. Prisoners and 16 and 17-year old students were roughly similar in productive capacity, both as regards quantity and quality of work.

Before we leave the subject of the productiveness of the labor we must remark the effect of fire fighting upon it. So depleted were the regular fire suppression crews and the usual reserves called upon in times of emergency, and so urgent was the need for assistance especially during July and August, that blister rust crews spent much of their time during these months suppressing fires. Crews were requisitioned both by the California State Division of Forestry and the Forest Service. During the season the Bureau's cooperative camps spent 24 per cent of the total number of work days in fire suppression; the Lassen operation was hardest hit, where 32 per cent of the work days were so spent (see table on page 38, Part III). Although this was a serious deduction from ribes eradication, the presence of blister rust crews in critical fire areas and their effective use were a cardinal factor in the successful suppression of forest fires in California.

In its relation to ribes eradication, however, fire fighting had a harmful effect. Besides the direct loss of a great many man days, the necessity for the recuperation of the boys after long periods on the fire line caused the



loss of still more effective man days. Injuries, sickness, and poison oak affliction added more lost time. Even after their return to work from a fire, it took several days for the boys to return to the normal production rate owing to the lasting effect of the fatigue to which they were subjected on some fires. All this resulted in a notably lowered general efficiency and output during the last half of the season and accounted in part for fewer acres covered and ribes destroyed than had been expected. The general use of blister rust crews on fire will always have a similar effect, varying in degree only, no matter what the type of labor used.

### Checking

Under the direction of the Bureau's checking supervisors checking work was conducted much as in other years. As qualified applicants for checking positions were few, out of 49 checkers 23 were students 16 and 17 years old. These boys required painstaking training over a relatively long period and the closest kind of supervision. Their production was low and the quality and accuracy of their work generally mediocre. The few school teachers that were hired made good checkers. Thirty three checkers, thirteen senior checkers, and three checker foremen were employed in the Region. Since the checking supervisor positions on the Eldorado and Stanislaus Forests had been vacated, two checker foremen, who acted as supervisors under the direction of the operation supervisors, were employed: Richard G. Lillard on the Eldorado and George B. Beardwood on the Stanislaus.

Arrangements were made with the other Federal agencies, as in previous years, for the conduct of checking work on their projects. These arrangements, authorized by working agreements existing between the Bureau and the Federal agencies, permitted the employment of all checkers by the Bureau with reimbursement from the other agencies for the salaries of checkers assigned to their projects. Under this system the Bureau was wholly responsible for all checking work, which, being a notably technical activity, conformed to the Bureau's position as director of technical work.

The amount of checking work performed in 1943 is summarized in Tables 7, 8, and 9 on pages 25 to 27. The explanatory notes about these tables appearing on pages 10 and 11 of the Annual Report for 1942 still apply, and will not be repeated here.

### Scouting for Blister Rust

This project is reported in full in Part VII, and a concise summary of work and results appears on page 85.

### Master Records

At the end of the 1943 season the permanent records and maps covering the work of all agencies were brought up to date. The types of these records are enumerated on pages 11 and 12 of the Annual Report for 1942.

## FINANCIAL STATEMENTS

During the 1943 calendar year the control program was carried on in the Sugar Pine Region entirely from regular Congressional appropriations to the Bureau and cooperating Federal agencies together with cash contributions from the State of California and private cooperators.

The allotments made to the cooperating Federal agencies for expenditure in the Sugar Pine Region for the 1943 and 1944 fiscal years are shown in Financial Table 1 on the following page. Financial Table 2 shows the expenditures by these same agencies for the respective halves of the two fiscal years making up the calendar year 1943. Any unexpended balances for the fiscal year 1943 may be determined by a comparison with similar tables in the 1942 Annual Report.

Financial Table 3 pertains only to expenditures of this Bureau and shows expenditures by project and appropriation symbol, and by State separated to show amounts expended for salaries and wages, and for other expenses. The amounts shown as salaries are the net payments after deductions for subsistence from the earnings of the employees. The cost of subsistence supplies is included under "Expenses". Also included as a part of this table are the expenditures of the Developmental and Investigative Unit headquartered at Berkeley, whose bookkeeping records are maintained and vouchers processed through the Oakland Regional Office. The expenditures of the Berkeley Unit include the salaries, expenses, and operating costs of two of its personnel headquartered at the Northwestern Regional Office at Spokane, Washington.

Financial Table 4 (also shown as Table 7, page 45) shows the amounts contributed in cash by the State of California and the three cooperating lumber companies for ribes eradication in California and the amounts allocated by the Federal Government for the purpose of matching such contributions under the provisions of the "Lea Act", Public Law 486, 76th Congress. This table also shows the accumulative expenditures from "Lea Act" funds from July 1, 1941 through December 31, 1942; such expenditures during the period January 1 to December 31, 1943, and the balances available for expenditure as of January 1, 1944. The available Federal funds must be expended prior to July 1, 1944; the cash contributions from State and private sources remain available until expended.

Although not directly reflected in any of the financial tables, since the funds expended were credited back to the appropriations and projects from which expended, was an amount of \$34,215 expended primarily for wages of blister rust control employees engaged in emergency fire fighting at the call of the California State Division of Forestry and the U. S. Forest Service. Of the sum expended the California State Division of Forestry reimbursed the Bureau for \$24,724 and the U. S. Forest Service the balance of \$9,491. On page 38 will be found a statement showing the percentage of time spent in fighting fire by Bureau employees.

Omnibus Tables 5 and 6A present a summary of expenditures for 1943 and a summary of expenditures for the entire period of operation for all cooperating agencies and for emergency fund programs as well as regular fund programs.

TABLE 1

FISCAL YEAR ALLOTMENTS FROM WHICH FEDERAL EXPENDITURES WERE MADE  
IN THE SUGAR PINE REGION DURING THE CALENDAR YEAR 1943

ALL REGULAR FUNDS

<u>Agency</u>	<u>Fiscal Year 1943</u>	<u>Fiscal Year 1944*</u>
Bureau of Entomology and Plant Quarantine. . . . .	\$ 142,770	\$ 145,695
Forest Service, Region 5 (California) . . . . .	286,192	278,000
Forest Service, Region 6 (Oregon) . . . . .	41,000	60,000
National Park Service:		
Yosemite National Park. . . . .	60,242	44,700
Sequoia National Park . . . . .	19,850	17,000
Lassen Volcanic National Park . . . . .	5,000	17,000
Regional Office . . . . .	4,600	4,300
Oregon and California Revested Lands Administration. . . . .	<u>46,880</u>	<u>46,000</u>
Total - Sugar Pine Region . . . . .	\$ 606,534	\$ 612,695

\*Figures in this column represent allotments as they are known as of December 31, 1943, and are subject to change until June 30, 1944.

TABLE 2

## FEDERAL EXPENDITURES IN THE SUGAR PINE REGION FOR CALENDAR YEAR 1943

REGULAR FUNDS

	California		Oregon		Region
	Fiscal Year 1943	Fiscal Year 1944	Fiscal Year 1943	Fiscal Year 1944	
	1/1/43-6/30/43	7/1/43-12/31/43	1/1/43-6/30/43	7/1/43-12/31/43	Total
Bureau of Entomology and Plant Quarantine . . . . .	\$ 67,259	\$ 100,200	\$ 5,212	\$ 4,431	\$ 177,102
Forest Service, Region V . . . . .	97,914	135,733	-	-	233,647
Forest Service, Region VI . . . . .	-	-	29,262	47,011	76,273
National Park Service:					
Yosemite National Park. . . . .	17,896	29,593	-	-	47,489
Sequoia National Park . . . . .	4,051	13,224	-	-	17,275
Lassen National Park. . . . .	3,989	15,231	-	-	19,220
Regional Office . . . . .	2,517	2,775	-	-	5,292
Oregon and California Revested Lands Administration . . . . .	-	-	13,662	22,450	36,112
Total - Sugar Pine Region. . . . .	\$ 193,626	\$ 296,756	\$ 43,136	\$ 73,892	\$ 612,410



TABLE 3

## CLASSIFIED BUREAU EXPENDITURES BY STATE, APPROPRIATION SYMBOL, AND PROJECT

Sugar Pine Region - January 1 to December 31, 1943

Appropriation Symbol Project No.	Fiscal Year 1943 1232245(66).030		Fiscal Year 1944 1242245(66).030		12X8200(13).213* X2132.14 Total
	3101.14	3103.14	3101.14	3103.14	
California					
Salaries	\$ 22,342.53	\$ 22,666.71	\$ 31,152.80	\$ 45,296.65	\$ 23,018.35
Expenses	11,686.69	10,561.34	5,783.64	17,967.59	1,013.87
Total	34,029.22	33,228.05	36,936.44	63,264.24	24,032.22
Oregon					
Salaries	3,841.40	-	3,828.24	-	-
Expenses	1,370.56	-	602.65	-	-
Total	5,211.96	-	4,430.89	-	-
Sugar Pine Region					
Salaries	26,183.93	22,666.71	34,981.04	45,296.65	23,018.35
Expenses	13,057.25	10,561.34	6,366.29	17,967.59	1,013.87
Total	\$ 39,241.18	\$ 33,228.05	\$ 41,367.33	\$ 63,264.24	\$ 24,032.22
					\$ 201,133.02

\*Contributed cooperative funds: X2132.14 State of California, Division of Forestry - \$50,000.  
 The Diamond Match Company, the Michigan-California Lumber Company, and the Red River Lumber Company  
 each contributed \$2,000 of which money none was used during 1943.

## D &amp; I Unit\*\*

Salaries	\$ 10,453.12	-	\$ 10,599.26	-	\$ 21,052.38
Expenses	1,107.10	-	776.50	-	1,883.60
Total	\$ 11,560.22	-	\$ 11,375.76	-	\$ 22,935.98

\*\*Amounts shown in these columns represent expenditures of the Developmental and Investigative Unit headquartered at Berkeley from funds allocated directly to that Unit, but whose accounts and vouchers were processed by the Oakland business office.

TABLE 4

STATUS OF COOPERATIVE FUNDS FOR RIBES ERADICATION OF STATE AND PRIVATE LANDS  
IN CALIFORNIA - JULY 1, 1941 TO DECEMBER 31, 1943

Cooperative Funds	Accumulative Expenditures 7/1/41 - 12/31/42	Expenditures Calendar Year 1943	Available Balances as of 1/1/44
State & Private Cash Contributions:			
State of California*	\$100,000	\$ 24,033	\$ 40,331
Michigan-Calif. Lumber Co.***	4,000	-	2,049
Red River Lumber Co.**	4,000	-	2,048
Diamond Match Co.**	4,000	-	2,003
Total	\$112,000	\$ 24,033	\$ 46,431
Federal Allotments (Lea Act Only):			
1942 Fiscal Year	14,625	-	-
1943 Fiscal Year***	71,770	33,228	-
1944 Fiscal Year	75,595	63,264	12,431
Total (Project 3103.14)	162,090	96,492	12,431
Grand Total	\$274,090	\$ 120,525	\$ 58,862

\*Consists of \$50,000 appropriated for the 1941-43 biennium plus \$50,000 of the \$100,000 appropriated for the biennium 1943-45. Additional \$50,000 not yet deposited with Treasurer of the United States for expenditure.

\*\*Consists of \$2,000 each for fiscal years 1943 and 1944.

\*\*\*Original allotment of \$64,695 augmented late in the fiscal year by an additional \$7,075 from Deficiency Appropriation Bill for overtime.

\* \* \* \* \*

NOTE: Funds in the amount of \$34,215 were expended in 1943 for emergency fire suppression at the call of the State Division of Forestry and the U. S. Forest Service. These agencies reimbursed blister rust control funds for the expenses incurred - \$24,724 from the State and \$9,491 from the U. S. Forest Service. These amounts were credited back to the funds from which expended and are included above as part of the balances available for expenditures. The time spent fighting fire, by reducing the budgeted program for blister rust control, caused a lesser amount of contributed funds to be expended than was planned. However, the unexpended balances plus additional cash contributions and Federal appropriations anticipated for expenditure after June 30, 1944 will finance the 1944 calendar year program.

OMNIBUS TABLE 5  
SUMMARY OF EXPENDITURES FOR 1943

State	Total			Recapitulation of Federal Funds					
	Federal (All agencies)	State (Including all Coop. Funds)	Grand Total	Regular Funds					
				Bureau Entomology & Plant Quarantine		Department of Interior			Total Regular Funds
				Leadership & Coord. (3101)	Lee Act (3103)	Forest Service	National Parks	O & C	
California	\$ 490,382	\$ 34,232	\$ 524,614	\$ 70,966	\$ 96,493	\$ 233,647	\$ 89,276	-	\$ 490,382
Oregon	122,028	1,000	123,028	9,643	-	76,273	-	\$ 36,112	122,028
Total - -	\$ 612,410	\$ 35,232	\$ 647,642	\$ 80,609	\$ 96,493	\$ 309,920	\$ 89,276	\$ 36,112	\$ 612,410

State	Financial Projects										
	BLR-1 - Leadership, Coordination and Technical Direction				BLR-3 - Cooperative Bilster Rust Control on State and Privately-Owned Lande				BLR-4 Forest Service	BLR-5 National Parks	BLR-6 O & C Revested Lande
	Indirect, Aid- State	Federal		Total	Direct Aid- State*	Federal		Total			
		Regular	Emergency			Regular	Emergency				
California	\$ 10,200	\$ 70,966	-	\$ 81,166	\$ 24,032	\$ 96,493	-	\$ 120,525	\$ 233,647	\$ 89,276	-
Oregon	1,000	9,643	-	10,643	-	-	-	-	76,273	-	\$ 36,112
Total - -	\$ 11,200	\$ 80,609	-	\$ 91,809	\$ 24,032	\$ 96,493	-	\$ 120,525	\$ 309,920	\$ 89,276	\$ 36,112

\*Including all local cooperative funds.

OMNIBUS TABLE 6A  
SUMMARY OF ALL EXPENDITURES, 1918-1943 (INCLUSIVE)

State	Federal (All Agencies Including State WPA Projects)	State (Including all Coop Funds)		Grand Total (State and Federal Funds)	Recapitulation of Regular Funds						
		Indirect Aid	Direct Aid (Rifles Excl.)		B.F.I. & B.E.F.Q.	Forest Service	Department of Interior			Total	Total
							National Parks	O & C	Total		
California	\$ 5,570,506	\$ 299,700	\$ 65,568	\$ 5,935,774	\$ 899,934	\$ 1,012,280	\$ 208,540	-	\$ 208,540	\$ 2,120,754	
Oregon	1,055,157	184,300	-	1,239,457	276,490	91,660	-	\$ 88,119	88,119	456,269	
Total - -	\$ 6,625,663	\$ 484,000	\$ 65,568	\$ 7,175,231	\$ 1,176,424	\$ 1,103,940	\$ 208,540	\$ 88,119	\$ 296,659	\$ 2,577,023	

State	Recapitulation of Emergency Funds											
	Federal W.F.A.			State W.F.A. (All Bureau)	C.C.C. and S.C.S.			P.W.A.			CWA, ARA, ERA, NYA, & C.F.S. Camps	Grand Total
	Bureau	Forest Service	Total		Forest Service and State Camps	Dept. Interior	Total	Bureau	Forest Service	Total		
California	\$ 1,855,438	\$ 509,542	\$ 2,364,980	-	\$ 218,715	\$ 192,692	\$ 411,407	\$ 396,438	\$ 276,927	\$ 673,365	-	\$ 3,449,752
Oregon	479,062	-	479,062	\$ 20,666	1,126	6,021	7,147	89,507	-	89,507	\$ 2,506	598,888
Total - -	\$ 2,334,500	\$ 509,542	\$ 2,844,042	\$ 20,666	\$ 219,841	\$ 198,713	\$ 418,554	\$ 485,945	\$ 276,927	\$ 762,872	\$ 2,506	\$ 4,048,640

\*No expenditures in Sugar Pine Region prior to 1923.



REGIONAL SUMMARY TABLES

OF

RIBES ERADICATION AND OF CHECKING

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TABLE 1  
THE STATUS OF RIBBE ERADICATION IN THE SUGAR PINE REGION AS OF DECEMBER 31, 1943

Part A - California

Part A - California													
Control Operation	Class of Ownership	Control Units		Status of Ribes Eradication									
		Total Acres	Acres Unworked	First Working		Reseeding			Total All Workings				
				Acres Worked	Man Days	Acres Worked	Man Days	Acres Worked	Man Days	Acres Worked	Man Days	Ribes Eradicated	
National Forests													
Mendocino	Federal	21,017	21,017										
	Private	15,179	15,179										
	State	48	48										
Trinity	Total	36,244	36,244										
	Federal	122,575	122,575										
	Private	40,283	40,283										
Klamath	State	2,085	2,085										
	Total	164,936	164,936										
	Federal	13,500	13,500	3,746	2,701	375,561				3,746	2,701	375,561	
Shasta	Private	26,850	26,850	11,708	10,947	777,204				11,708	10,947	777,204	
	Total	40,350	40,350	15,454	13,648	1,152,765				15,454	13,648	1,152,765	
	Federal	3,611	3,611										
Lassen	Private	74,151	74,151										
	Total	77,762	77,762										
	Federal	69,142	69,142	9,559	5,704	963,955	1,997	552	35,662	11,656	6,316	1,019,847	
Plumas	Private	208,085	208,085	37,693	24,083	3,594,351	11,622	4,132	128,462	22,275	4,062	28,275	
	State	1,055	1,055										
	Total	314,148	314,148	47,494	29,847	4,516,316	13,613	4,744	526,151	61,113	34,591	5,066,467	
Tahoe	Federal	186,565	186,565	79,559	46,510	10,167,857	41,593	24,716	2,501,621	121,358	73,245	12,688,508	
	Private	125,510	125,510	66,659	45,349	6,972,555	39,625	22,922	2,886,958	105,345	66,271	11,859,511	
	State	360	360	40	21	4,620				40	21	4,620	
Sierra	Total	312,576	312,576	146,338	99,900	19,175,032	81,394	47,638	5,388,509	227,732	147,518	24,565,544	
	Federal	19,381	19,381										
	Private	39,808	39,808										
El Dorado	State	117,728	117,728	66,453	33,023	9,511,905	35,706	22,087	1,469,937	102,160	55,085	10,981,842	
	Private	126,607	126,607	83,794	50,542	12,969,259	38,635	22,945	1,958,102	122,689	73,487	15,323,361	
	State	2,642	2,642	2,602	1,534	100,891	1,103	383	16,706	3,705	2,017	103,597	
Stanislaus	Total	246,574	246,574	152,893	85,205	22,765,085	79,704	45,385	3,445,749	228,553	130,592	26,274,820	
	Federal	105,591	105,591	76,499	33,135	7,582,578	32,572	10,592	6,046,993	148,571	62,727	15,050,777	
	Private	122,525	122,525	105,501	52,113	17,490,608	56,004	28,811	2,903,127	161,605	80,330	20,393,744	
Sierra	State	407	407	129	129	16,768				407	129	16,768	
	Total	229,624	229,624	182,507	85,169	25,490,054	128,176	58,803	8,551,226	130,585	143,189	15,728,168	
	Federal	173,391	173,391	126,686	68,169	18,433,656	32,971	23,477	8,512,593	79,676	111,646	26,645,715	
Sequoia	Private	49,082	49,082	32,956	16,156	24,382	5,708,223	6,785	4,185	870,735	22,941	26,567	5,578,958
	State	40	40										
	Total	222,513	222,513	159,592	62,861	112,551	23,841,279	39,756	27,662	9,383,394	102,617	140,213	33,224,673
Sequoia	Federal	15,910	15,910										
	Private	16,880	16,880										
	State	62,810	62,810										
Total All National Forests	Federal	884,272	884,272	216,328	216,328	47,186,122	184,545	101,394	18,568,028	467,316	317,722	65,794,150	
	Private	865,962	865,962	521,753	207,422	49,448,800	151,703	82,445	9,111,591	474,754	289,877	58,579,531	
	State	6,940	6,940	1,945	1,049	1,784	3,329	1,103	163	18,700	4,152	2,167	320,985
National Parks													
Lassen Volcanic	Federal	17,792	17,792	13,750	5,215	700,351	1,960	1,074	98,480	15,710	6,289	798,841	
	Private	140	140										
	State	17,932	17,932	13,890	5,270	715,338	1,976	1,080	99,816	15,856	6,350	814,556	
Yosemite	Federal	120,580	120,580	57,520	25,823	12,389,136	10,534	15,208	2,628,327	68,454	101,031	15,017,473	
	Private	2,510	2,510										
	State	123,130	123,130	57,520	25,823	12,389,356	10,934	15,208	2,628,327	68,454	101,031	15,017,473	
Kings Canyon	Federal	22,430	22,430	19,189	3,241	5,132	856,010						
	Private	82,678	82,678	72,798	9,860	9,061	1,229,485						
	State	243,321	243,321	120,321	105,261	15,150,252	12,894	15,282	2,726,807	97,285	121,533	17,882,053	
Total All National Parks	Federal	245,529	245,529	191,391	105,261	15,150,252	12,894	15,282	2,726,807	97,285	121,533	17,882,053	
	Private	2,650	2,650	140	55	14,977	45	6	718	155	61	15,715	
	State	246,170	246,170	161,659	84,531	106,306	15,170,293	12,909	16,288	2,727,545	97,440	121,594	17,897,774
State Parks													
Latour	Private	1,200	1,200										
	State	1,150	1,150										
	Total	2,350	2,350										
Calaveras Big Trees	Private	130	130	120	21	1,260	75	20	722	195	41	3,362	
	State	1,971	1,971	1,748	1,318	1,851,001	1,285	472	26,595	1,011	1,730	211,636	
	Total	2,093	2,093	1,868	1,339	1,852,261	1,360	492	27,317	1,206	1,831	215,578	
Total All State Parks	Private	1,120	1,120	130	21	1,260	75	20	722	195	41	3,362	
	State	1,131	1,131	1,748	1,318	1,851,001	1,285	472	26,595	1,011	1,730	211,636	
	Total	4,451	4,451	1,868	1,339	1,852,261	1,360	492	27,317	1,206	1,831	215,578	
Total													
Total All Control Operations	Federal	1,127,792	1,127,792	367,168	321,579	49,341,374	197,439	117,676	21,294,835	504,601	439,255	83,616,209	
	Private	865,962	865,962	521,753	207,422	49,448,800	151,703	82,445	9,112,591	474,754	289,877	58,579,531	
	State	9,773	9,773	4,797	4,102	517,280	2,368	851	45,301	7,165	3,557	562,581	
Total													
		2,003,527	2,003,527	693,718	533,103	112,345,054	351,510	201,012	30,452,526	1,046,670	731,191	142,758,078	





TABLE 1 (Continued)  
THE STATUS OF RIBES ERADICATION IN THE SUGAR PINE REGION AS OF DECEMBER 31, 1943

Part B - Oregon

Control Operation		Class of Ownership*	Control Unite		Status of Ribes Eradication							
			Total Acre	Acre Unworked	First Working		Reradication		Total All Workings			
					Acre Worked	Man Days	Acre Worked	Man Days	Acre Worked	Man Days	Ribes Eradicated	
National Forests												
Klamath	National Forest	9,031	5,292	3,733	4,507	419,719				3,733	4,507	419,719
	O & C	4,573	4,573									
	Total	13,604	9,865	3,733	4,507	419,719				3,733	4,507	419,719
	Private	1,552	723	829	1,882	113,810				829	1,882	113,810
	Total	15,156	10,588	4,562	6,389	533,529				4,562	6,389	533,529
Rogue River	National Forest	87,491	22,066	65,425	39,177	14,597,116	25,291	9,671	1,113,846	90,716	48,848	15,710,362
	O & C	17,350	11,265	6,084	1,830	244,071				6,084	1,830	244,071
	Total	104,841	33,331	71,509	41,007	14,841,187	25,291	9,671	1,113,846	96,800	50,678	15,955,033
	Private	79,010	6,300	70,710	7,903	1,145,112	12,667	2,088	175,528	83,377	19,350	1,320,527
	Total	183,851	41,631	142,219	48,910	15,986,299	37,958	11,759	1,289,374	180,177	60,169	17,275,620
Siskiyou	National Forest	67,572	50,323	17,250	5,514	322,461				17,250	5,514	322,461
	O & C	101,450	70,058	31,402	7,616	443,184				31,402	7,616	443,184
	Total	169,022	120,381	48,652	13,130	765,645				48,652	13,130	765,645
	Private	77,347	41,426	35,921	5,517	500,284				35,921	5,517	500,284
	Total	246,369	161,807	84,573	18,647	1,265,929				84,573	18,647	1,265,929
Unquama**	National Forest	60,353	60,353									
	O & C	6,158	6,158									
	Total	66,511	66,511									
	Private	8,266	8,266									
	Total	74,777	74,777									
Total All National Forests	National Forest	224,447	138,033	85,414	42,238	15,339,696	25,291	9,671	1,113,846	111,705	58,666	16,453,542
	O & C	128,561	92,055	37,486	9,446	689,255				37,486	9,446	689,255
	Total	353,008	230,088	122,900	51,684	16,028,951	25,291	9,671	1,113,846	149,191	68,112	17,142,797
	Private	186,475	60,785	105,390	14,802	1,759,399	12,667	2,088	175,528	116,057	19,350	1,934,731
	Total	539,483	290,873	228,290	66,486	17,788,350	37,958	11,759	1,289,374	265,248	87,462	19,083,528
National Parks												
Crater Lake	Federal	3,782	150	3,632	412	130,162	350	81	13,430	3,982	493	143,596
Nursery Sanitation												
McDonald State Forest (Clark-McLary Nursery)	Private	418		418	178	2,247				418	178	2,247
	State	462	50	412	174	2,472				412	174	2,472
	Total	880	50	830	352	4,719				830	352	4,719
O & C (McKinley Nursery)	O & C	168	58	110	162	5,462				110	162	5,462
	Private	132	80	52	111	2,477				52	111	2,477
	Total	300	138	162	273	7,939				162	273	7,939
Total All Nurseries	O & C	168	58	110	162	5,462				110	162	5,462
	Private	462	50	412	174	2,472				412	174	2,472
	Total	1,180	200	980	636	11,358				980	636	11,358
Mt. Hebo White Pine Plantation												
Siulaw National Forest	Federal	680		680	373	124,744	212	228	29,957	892	601	154,701
Total												
Total All Control Operations	Federal	358,512	230,258	128,322	59,691	16,225,319	25,851	9,580	1,157,233	155,175	59,691	17,382,552
	Private	166,725	60,877	105,848	15,091	1,759,639	12,667	2,088	175,528	116,057	19,350	1,934,469
	Total	525,237	291,135	234,170	74,782	18,000,749	38,518	12,668	1,332,761	271,232	87,057	19,317,021

\*Ownership as of February 15, 1939

\*\*Ownership of 10,128 acres of Federal land controversial between the United States Forest Service and the Oregon and California Revested Lands Administration. In these computations this acreage is listed as National Forest land.

Part C - Total For The Sugar Pine Region

California and Oregon	Federal	1,826,410	990,926	495,468	381,270	78,628,693	221,892	127,655	22,452,058	718,776	508,926 101,078,761
	Private	1,013,687	605,826	427,861	222,589	51,251,067	165,758	84,589	9,288,176	531,619	307,158 60,539,443
	Total	2,840,097	1,596,752	923,329	603,859	129,879,760	387,650	212,244	31,740,234	1,250,545	816,084 161,618,204



TABLE 2

## SUMMARY OF RIBES ERADICATION IN THE SUGAR PINE REGION - 1943

Operation	Class of Work	Acres Worked	8-Hour Man Days	Ribes Eradicated
California				
Klamath Nat'l Forest	Initial	5,269	5,435	386,688
	Initial	6,874	7,113	1,341,414
Lassen Nat'l Forest	Reeradication	1,577	291	60,622
	Total	8,451	7,404	1,402,036
Plumas Nat'l Forest	Initial	2,093	1,888	321,259
	Reeradication	12,386	5,479	1,010,934
	Total	14,479	7,367	1,332,193
Eldorado Nat'l Forest	Initial	1,605	1,478	208,633
	Reeradication	4,770	2,695	210,363
	Total	6,375	4,173	418,996
Stanislaus Nat'l Forest	Initial	1,780	4,135	861,718
	Reeradication	4,810	2,846	519,399
	Total	6,590	6,981	1,381,117
Sierra Nat'l Forest	Reeradication	2,784	3,515	560,497
National Forest Total	Initial	17,621	20,049	3,119,712
	Reeradication	26,327	14,826	2,361,815
	Total	43,948	34,875	5,481,527
Lassen Volcanic Nat'l Park	Reeradication	1,975	1,080	99,218
Yosemite Nat'l Park	Initial	272	1,374	218,831
	Reeradication	2,722	3,101	331,270
	Total	2,994	4,475	550,101
Sequoia Nat'l Park	Initial	2,224	1,830	239,068
National Park Total	Initial	2,496	3,204	457,899
	Reeradication	4,697	4,181	430,488
	Total	7,193	7,385	888,387
California Total	Initial	20,117	23,253	3,577,611
	Reeradication	31,024	19,007	2,792,303
	Total	51,141	42,260	6,369,914
Oregon				
Rogue River Nat'l Forest	Initial	1,767	1,780	187,740
	Reeradication	3,306	3,280	200,563
	Total	5,073	5,060	388,303
Siskiyou Nat'l Forest	Initial	8,310	2,744	112,246
Siuslaw Nat'l Forest	Initial	70	51	2,585
Oregon Total	Initial	10,147	4,575	302,571
	Reeradication	3,306	3,280	200,563
	Total	13,453	7,855	503,134
Sugar Pine Region				
California and Oregon	Initial	30,264	27,828	3,880,182
	Reeradication	34,330	22,287	2,992,866
	Total	64,594	50,115	6,873,048









TABLE 4  
SUMMARY OF RIBES PREDICATION BY LAND OWNERSHIP AND NUMBER OF WORKING IN THE SUGAR PINE REGION - 1953

Land Ownership	Status of Ribes Predication											
	First Working			Second Working			Third Working			Fourth Working		
	Acres Worked	Ribes Predicated	6-Hour Men	Acres Worked	Ribes Predicated	6-Hour Men	Acres Worked	Ribes Predicated	6-Hour Men	Acres Worked	Ribes Predicated	6-Hour Men
California												
National Forest	3,709	3,319	697,875	5,034	3,135	135,520	7,183	5,589	1,051,748	40	39	7,309
O & C Revested Lands Admin.	2,436	3,704	957,832	1,682	4,175	183,750						
National Park	6,395	6,553	1,055,774	9,716	7,170	695,550	7,183	5,589	1,055,748	40	39	7,309
Private	31,542	10,170	4,374,157	1,403	365	18,426	8,360	3,172	358,476	102	8	1,450
State	13,912	16,759	2,971,837	4,577	2,400	110,594	6,178	540,616				
Total	20,117	25,292	3,577,611	15,798	10,153	1,189,560	15,465	6,761	1,954,594	195	87	12,193
Oregon												
National Forest	4,012	2,598	112,045	660	698	91,227	2,132	2,179	106,276	13	8	56
O & C Revested Lands Admin.	5,062	4,009	2,071,932	660	698	91,227	2,132	2,179	106,276	13	8	56
National Park	2,053	572	42,379									
Private	10,147	302,571	660	698	91,227	2,132	2,179	106,276	13	8	56	
Total	21,274	714,917	2,287,974	2,078	1,405	91,227	2,132	2,179	106,276	26	16	112
Sugar Pine Region												
National Forest	7,724	5,317	720,280	5,694	4,033	317,427	9,333	7,186	1,160,034	53	47	7,275
O & C Revested Lands Admin.	4,072	3,409	97,457	1,682	4,175	183,750						
National Park	15,575	21,526	1,857,466	10,376	6,298	997,177	6,742	7,186	1,160,034	53	47	7,275
Private	15,575	21,526	1,857,466	10,376	6,298	997,177	6,742	7,186	1,160,034	53	47	7,275
State												
Total	50,756	27,428	3,660,182	16,076	11,031	1,276,747	14,103	11,173	1,703,788	171	103	12,293

TABLE 5  
SUMMARY OF RIBES PREDICATION BY LAND OWNERSHIP AND NUMBER OF WORKING IN THE SUGAR PINE REGION - 1952-1953

Land Ownership	Status of Ribes Predication																	
	First Working			Second Working			Third Working			Fourth Working								
	Acres Worked	6-Hour Men	Ribes Predicated	Acres Worked	6-Hour Men	Ribes Predicated	Acres Worked	6-Hour Men	Ribes Predicated	Acres Worked	6-Hour Men	Ribes Predicated						
California																		
National Forest	252,771	215,428	47,185,122	144,551	79,165	14,286,152	30,837	18,572	4,024,829	5,677	2,784	180,132	3,228	875	56,554	367,316	317,722	57,758,120
O & C Revested Lands Admin.	37,573	25,771	5,597,171	2,677	1,084	2,103,697	1,034	4,094	6,877	2,784	180,132	3,228	875	56,554	367,316	317,722	57,758,120	
National Park	13,765	10,142	1,748,156	1,084	1,084	1,748,156	1,084	1,084	1,748,156	1,084	1,084	1,748,156	1,084	1,084	1,748,156	1,084	1,084	1,748,156
Private	322,013	207,142	49,482,437	137,528	76,320	6,094,556	11,191	5,503	998,200	682	203	31,468	590	56	2,607	1,712,104	289,212	58,959,288
State	4,737	1,102	2,531	834	44,114	1,951	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102
Total	693,171	529,417	112,249,591	291,079	172,684	25,124,151	46,163	24,881	5,994,159	6,559	3,994	197,688	3,516	930	59,338	1,925,673	121,931	161,762,016
Oregon																		
National Forest	47,043	49,527	15,168,163	29,053	7,315	3,193,784	2,895	2,555	150,581	13	8	56			113,492	58,499	116,698,383	
O & C Revested Lands Admin.	1,034	9,006	1,034	81	3,110										1,332	403	133,493	
National Park	37,573	25,771	5,597,171	2,677	1,084	2,103,697	1,034	4,094	6,877	2,784	180,132	3,228	875	56,554	367,316	317,722	57,758,120	
Private	10,147	302,571	660	698	91,227	2,132	2,179	106,276	13	8	56	6,283	5,431	376,214				
State																		
Total	20,117	25,292	3,477,611	15,798	10,153	1,189,560	15,465	6,761	1,954,594	195	87	12,193	51,241	42,863	6,959,934			
Sugar Pine Region																		
National Forest	365,655	265,393	62,560,162	167,538	86,002	15,286,354	31,722	21,427	4,185,730	5,620	2,784	180,132	3,228	875	56,554	367,316	317,722	57,758,120
O & C Revested Lands Admin.	37,573	25,771	5,597,171	2,677	1,084	2,103,697	1,034	4,094	6,877	2,784	180,132	3,228	875	56,554	367,316	317,722	57,758,120	
National Park	13,765	10,142	1,748,156	1,084	1,084	1,748,156	1,084	1,084	1,748,156	1,084	1,084	1,748,156	1,084	1,084	1,748,156	1,084	1,084	1,748,156
Private	322,013	207,142	49,482,437	137,528	76,320	6,094,556	11,191	5,503	998,200	682	203	31,468	590	56	2,607	1,712,104	289,212	58,959,288
State	4,737	1,102	2,531	834	44,114	1,951	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102
Total	693,171	529,417	112,249,591	291,079	172,684	25,124,151	46,163	24,881	5,994,159	6,559	3,994	197,688	3,516	930	59,338	1,925,673	121,931	161,762,016



TABLE 6

## THE DISTRIBUTION OF CAMPS IN THE SUGAR PINE REGION DURING 1943

Control Operation	Agency and Fund	County	Number and Average Size of Camps	Approximate Period of Operation	Location
Oregon					
Siskiyou	FS - Reg.	Josephine	1 - 50	June 10 - Aug. 30	Oregon Caves
	O&C - Reg.	Josephine	1 - 40	June 10 - Aug. 20	Bunker Hill
Rogue	FS - Reg.	Jackson	1-50 - 1-25	June 10 - Aug. 31	Upper Rogue
	FS - Reg.	Douglas	1 - 25	July 1 - Aug. 15	Upper Rogue
Siuslaw	O&C - Reg.	Jackson	1 - 30	June 15 - Aug. 31	Pinehurst
	O&C - CPS	Coos	1 - 10	Oct. 1 - Oct. 10	McKinley Nursery
California					
Klamath	FS - Reg.	Siskiyou	2 - 50	May 15 - Oct. 15	Beaver Creek & Cinnabar Springs
Lassen Vol. N. P.	NPS - Reg.	Shasta	1 - 40	June 20 - Aug. 20	Manzanita Lake
	EQ - Reg.	Shasta	1 - 40	June 20 - Aug. 31	Hatchet Mt.
Lassen	EQ - Reg.	Tehama	1 - 50	June 15 - Aug. 31	Mill Creek
	EQ - Reg.	Butte	1 - 35	June 20 - Aug. 31	Reg Dump
Plumas	EQ - Reg.	Plumas	1 - 45	May 15 - Oct. 15	Humburg
	FS - Reg.	Plumas	1-45 - 2-30	June 20 - Sept. 15	Almanor
Plumas	FS - Reg.	Plumas	1 - 40	June 10 - Sept. 15	Meadow Valley
	EQ - Reg.	Butte	1 - 35	May 1 - June 30	Big Bar - Granite Basin
Eldorado	FS - Reg.	Eldorado	1 - 30	June 15 - Aug. 10	Strawberry Valley
	EQ - Reg.	Eldorado	2 - 35	June 15 - Aug. 31	Galdor
Stanislaus	FS - Reg.	Tuolumne	1 - 50	May 20 - Oct. 15	Davis Cabin & Butchers Corral
	EQ - Reg.	Tuolumne	1 - 35	June 10 - Aug. 31	Jawbone
Sierra	FS - Reg.	Tuolumne	1 - 40	June 15 - Aug. 31	Hazel Green
	FS - Reg.	Madera	2 - 40	June 15 - Aug. 31	Skull Creek
Yosemite	NPS - Reg.	Mariposa	1 - 50	July 1 - Aug. 15	Chowchilla Mt.
	NPS - Reg.	Mariposa	1 - 35	May 15 - Aug. 31	Crane Flat
Sequoia	NPS - Reg.	Tulare	1 - 35	June 15 - Sept. 10	Wawona
					Red Fir

TABLE 7

## SUMMARY OF REGULAR, ADVANCE, AND POST CHECKING IN THE SUGAR PINE REGION - 1943

Operation	Regular Check			Advance Check			Post Check		
	Acres Covered By Final Check	Per cent of Check	Man Days	Acres Covered	Per cent of Check	Man Days	Acres Covered	Per cent of Check	Man Days
Oregon									
Rogue River	3,522	5.5	99 7/8	3,115	4.2	51 1/8	13,375	4.9	290 6/8
Siskiyou	868	5.1	20 7/8	12,963	5.2	288 1/8	-	-	-
Total	4,390	5.5	120 6/8	16,078	5.0	339 2/8	13,375	4.9	290 6/8
California									
Klamath	4,228	4.4	86 3/8	3,239	3.2	39 1/8	-	-	-
Plumas - Lassen	590	4.2	10 1/8	2,339	2.9	30	23,410	3.1	252
Stanislaus	4,565	2.6	65 4/8	2,780	1.4	26 5/8	8,550	3.1	129 4/8
Eldorado	2,020	2.7	29	620	3.4	15 1/8	12,170	2.9	197
Sierra	2,124	5.4	90 5/8	-	-	-	6,636	2.5	63 1/8
Yosemite N. P.	2,336	4.7	47	-	-	-	1,997	3.6	34
Sequoia N. P.	2,683	4.5	44 1/8	-	-	-	-	-	-
Kings Canyon N. P.	-	-	-	-	-	-	-	-	-
Total	18,746	4.3	372 6/8	8,978	2.6	110 7/8	2,307	2.6	24
							55,570	3.0	699 5/8
Sugar Pine Region									
Total	23,136	4.5	493 4/8	25,056	4.1	450 1/8	68,945	3.4	990 3/8

TABLE 8

## ANALYSIS OF CHECKING COST AND PRODUCTION IN THE SUGAR PINE REGION - 1943

Operation	Class of Check	Man Days		Strip Acres	Strip Acres Per Checker Man Day		Total Cost	Cost Per Acre Basis Acres Covered by Check	Cost Per Strip Acre
		Number	Per cent of Total Checker Man Days		Checker	Man Day			
Oregon	Regular	120 6/8	14.3	239.9	2.2	2.8	\$ 1,104.75	\$ .252	\$4.61
	Advance	339 2/8	40.1	805.3	2.7	3.2	3,103.81	.193	3.85
	Post	290 6/8	34.4	658.0	2.5	3.1	2,660.09	.199	4.04
	All	750 6/8	88.8	1,703.2	2.5	3.1	6,868.65	.203	4.03
California	Regular	372 6/8	21.9	800.1	2.2	2.8	3,092.25	.165	3.86
	Advance	110 7/8	6.5	230.2	2.1	2.5	949.82	.106	4.13
	Post	699 5/8	41.0	1,652.8	2.3	2.7	5,813.25	.105	3.54
	All	1,183 2/8	69.4	2,683.1	2.3	2.7	9,855.32	.118	3.69
Total Sugar Pine Region	Regular	493 4/8	19.4	1,040.0	2.2	2.8	4,197.00	.181	4.04
	Advance	450 1/8	17.7	1,035.5	2.5	3.0	4,053.63	.162	3.91
	Post	990 3/8	38.8	2,310.8	2.4	2.8	8,473.34	.123	3.68
	All	1,934	75.9	4,386.3	2.4	2.8	\$16,723.97	\$ .143	\$3.82

TABLE 9  
ANALYSIS OF CHECKING TIME DEVOTED TO OTHER ACTIVITIES IN THE SUGAR PINE REGION - 1943

Operation	Eradication		Pine Count		Section Line Control		Fire		Total		Percent of Total Checker Man Days
	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost	Man Days	Total Cost	
Oregon	4	\$ 36.60	2	\$ 18.30	61	\$ 558.10	28	\$ 256.17	95	\$ 869.17	11.2
California	220 5/8	1,831.46	49	396.83	150 6/8	1,287.32	100 3/8	864.32	520 6/8	4,379.93	30.6
Total	224 5/8	\$1,868.06	51	\$415.13	211 6/8	\$1,845.42	128 3/8	\$1,120.49	615 6/8	\$5,249.10	24.1



OMNIBUS TABLES

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The Omnibus Tables are to be found on the pages following with the exception of certain ones which have been placed in relevant sections of the report. These are:

Part II - page 17:

Omnibus Table 5 - Summary of Expenditures for 1942  
Omnibus Table 6A- Summary of All Expenditures 1918\*-  
1942 (Inclusive)

Part III - page 44:

Omnibus Table 3 - Summary of Ribes Eradication on State  
and Private Lands - 1942  
Omnibus Table 4A- Summary of Ribes Eradication on State  
and Private Lands 1925 - 1942 (Incl.)

Part IV - page 53:

Omnibus Table 3 - Summary of Ribes Eradication on National  
Forest Land in 1943  
Omnibus Table 4A- Summary of Ribes Eradication on National  
Forest Land 1925 - 1943 (Inclusive)

Part V - page 62:

Omnibus Table 4A- Summary of Ribes Eradication on National  
Park Land - 1933 - 1943 (Inclusive)

Part VI - page 68:

Omnibus Table 3 - Summary of Ribes Eradication on O and C  
Land in 1943  
Omnibus Table 4A- Ribes Eradication on O and C Land 1925  
to 1943 (Inclusive)

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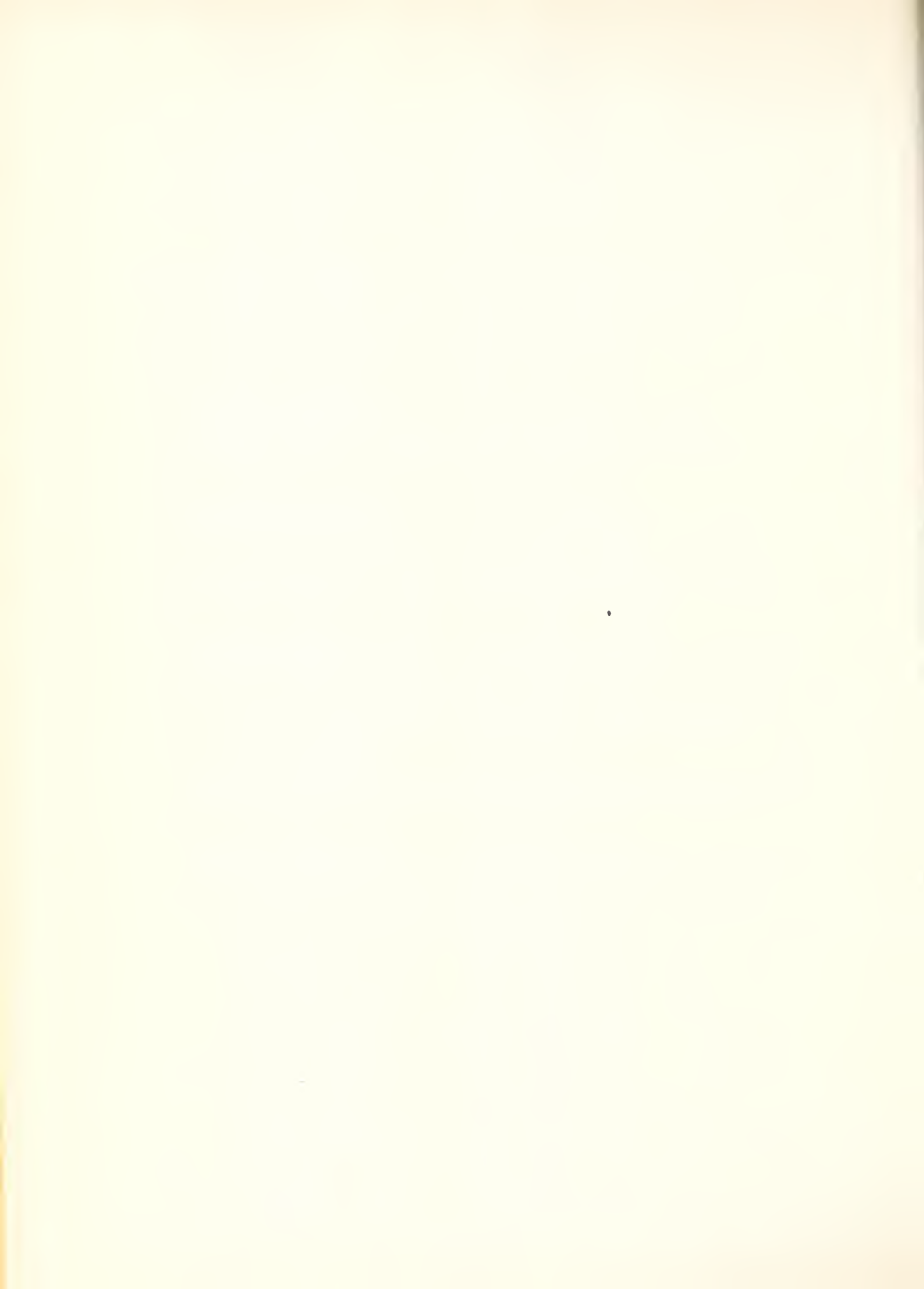
CONTINUED TABLE 1  
SUMMARY OF RIBS RELOCATION IN 1943

State	Initial Relocation Work				Recreation Work				Totals				Elbow Per Area		Number of Corps		Number of Employees				
	Average Worked	Number Wild & Cultivated Elbow Destroyed	Number Elbow Man Days	Number Elbow Man Days	Average Worked	Number Wild & Cultivated Elbow Destroyed	Number Elbow Man Days	Number Elbow Man Days	Average Wild & Cultivated Elbow Destroyed	Number Elbow Man Days	Initial Relocation	Recreation	Total	C.P.S. Regular	Total	Inhabitants		All Supervision	Total Employees		
																C.P.S.	Regular				
California	20,117	3,577,641	23,573	31,024	2,792,303	19,007	51,141	6,569,914	42,260	178	90	1.16	0.64	-	24	24	-	1,150	1,150	103	1,253
Oregon	10,147	3,025,571	4,575	3,306	200,551	3,280	13,453	503,134	7,895	60	61	1.21	0.59	1	6	7	10	300	310	24	334
Total - -	30,264	6,603,212	27,628	34,330	2,992,856	22,287	64,594	6,673,048	50,115	142	87	1.16	0.65	1	30	31	10	1,450	1,460	127	1,587

The maximum number of persons on the pay roll at the peak of the season.

CONTINUED TABLE 1A  
SUMMARY OF ALL RIBS RELOCATION 1955-1963 (INCLUSIVE)

State	Initial Relocation Work				Recreation Work				Initial and Reeducation				Per Acre						
	Gross Average Reported Worked	Number Elbow Man Days	Number Wild & Cultivated Elbow Destroyed	Number Elbow Man Days	Gross Average Reported Worked	Net Average in Control Area Reported	Number Wild & Cultivated Elbow Destroyed	Number Elbow Man Days	Gross Initial Reported	Net Average Initial Reported	Other Reported	Number Elbow Man Days	Initial Reported	Re- education Reported	Total Reported	Initial Reported	Total Reported		
California	593,572	693,372	112,346,051	232,172	352,698	297,658	55,860	203,012	1,046,670	693,372	297,658	55,860	142,798,078	8,625	733,131	162	86	0.71	0.57
Oregon	237,491	234,662	16,060,710	74,929	40,246	35,137	3,373	12,064	277,477	234,662	35,137	3,373	39,933,597	58,282	87,067	76	71	0.35	0.30
Total - -	931,463	928,034	128,406,761	307,101	392,944	332,795	59,233	215,076	1,324,147	928,034	332,795	59,233	182,731,675	66,907	820,198	140	63	0.69	0.54



OUTLINE TABLE 2

SUMMARY OF RIFES ERADICATION BY PROGRAMS IN 1945  
(including all work - initial and reeradication)

State	Regular and Cooperative*			C.P.S.		
	Acres Worked	Number Wild & Cultivated Rifles Destroyed	Number 8-Hour Man Days	Acres Worked	Number Wild & Cultivated Rifles Destroyed	Number 8-Hour Man Days
California	51,141	6,369,914	42,260	-	-	-
Oregon	13,343	560,549	7,804	70	2,965	51
Total - -	64,524	6,870,463	50,064	70	2,965	51

\*This includes work of Bureau, cooperating State and private agencies, Forest Service and Interior Department work with regular funds.  
This table recapitulates the totals on Table 1.

OUTLINE TABLE 3A

SUMMARY OF ALL RIFES ERADICATION BY PROGRAMS 1925-1945 (INCLUSIVE)  
(initial and reeradication)

State	Regular and Cooperative*			Emergency W.P.A. and E.A.A.			Emergency D.C.O., S.C.S. and C.P.S.			Emergency F.V.A. or N.R.A.			Total Emergency Programs		
	Acres Worked	Number Wild & Cultivated Rifles Destroyed	Number 8-Hour Man Days	Acres Worked	Number Wild & Cultivated Rifles Destroyed	Number 8-Hour Man Days	Acres Worked	Number Wild & Cultivated Rifles Destroyed	Number 8-Hour Man Days	Acres Worked	Number Wild & Cultivated Rifles Destroyed	Number 8-Hour Man Days	Acres Worked	Number Wild & Cultivated Rifles Destroyed	Number 8-Hour Man Days
California	281,167	25,759,873	146,062	412,434	69,670,817	316,170	114,795	25,782,037	198,140	209,194	21,395,351	72,879	756,383	117,036,205	588,129
Oregon	31,266	1,065,014	13,147	26,211	15,534,844	69,096	7,580	362,617	2,915	28,346	2,427,092	7,609	842,136	18,328,149	73,680
Total - -	312,753	26,824,887	159,509	438,645	85,205,661	376,866	122,375	26,144,654	201,055	237,540	23,812,353	80,488	1,007,519	135,364,698	661,749

\*This includes work of the Bureau, cooperating State and private agencies, Forest Service and Interior Department work with regular funds.  
This table recapitulates the totals in Table 1A.



OMNIBUS TABLE 2A

STATUS OF BLISTER RUST CONTROL, 1925-1943 (INCLUSIVE)

Acreage of White Pine in Net Control Area	Acreage of Net Control Area (White pine and Protection Zones)	Acreage of Net Control Area Initially Worked	Acreage of Net Control Area		Percentage Net Control Area Initially Worked	Acreage in Net Control Area Still Needing Initial Protection	Acreage in Net Control Area Now on Maintenance Basis*
			First Rework	Other Reworkings			
California							
2,004,527	2,004,527	693,972	297,638	55,260	34.6	14.8	303,163
Oregon							
526,793	526,793	234,882	35,147	3,373	44.6	6.8	121,455
Total							
2,531,320	2,531,320	928,854	332,785	58,633	36.7	13.1	424,618

\*Maintenance - Any area on which the ribes are so scarce that danger from blister rust is negligible for an indefinite period. To assure the continuation of this safe condition requires periodic examinations and in some instances ribes eradication by scouting methods.









OMITEUS TABLE 4

SUMMARY OF ALL OTHER CONTROL WORK FOR 1943

State	Nursery Sanitation				Mapping Control Areas			Treatment of Infected White Pines					Checkline				
	Number White Pines Worked	Number Bursaries Worked	Number Wild Bursaries Destroyed	Number Bursaries Destroyed (Man Days)	Number Acres Worked (Man Days)	Number Acres N. & P. Zones (Man Days)	Total Number Infected Pines Examined	Number Infected Pines From Which Cankers Removed	Number Cankers Removed	Branch	Stem	Number 8-Hour Man Days Checked	Advance Acres 8-Hour Checked	Number 8-Hour Checked	Advance Acres 8-Hour Checked	Number 8-Hour Checked	Regular Acres 8-Hour Checked
California	-	-	-	-	11,078	54	16,191	492	989	14,034	547	180	8,578	111	55,570	599	18,746
Oregon	1	240,000	70	2,595	15,640	164	13,646	476	775	8,311	533	102	16,078	339	11,375	291	4,390
Total - -	1	240,000	70	2,595	26,718	218	29,837	968	1,764	22,325	1,080	282	25,055	450	66,945	990	23,136

OMITEUS TABLE 5A

SUMMARY OF ALL OTHER CONTROL WORK, 1925-1943 (INCLUSIVE)

State	Cultivated Black Current Examination				Nursery Sanitation				Mapping Control Areas				Treatment of Infected White Pines				
	Number Inspections Made	Number Black Currents Destroyed	Number Black Currents Found	Number 8-Hour Destroyed Man Days	Sanitation Zones Maintained	Number Acres Maintaining Zones	Total Acres	Wild & Cultivated 8-Hour Pines Destroyed	Number 8-Hour Pines Examined	Number Acres Examined	Number 8-Hour Examined	Number 8-Hour Examined	Total Number Pines Examined	Number Pines From Which Cankers Removed	Number Pines From Which Cankers Removed	Branch	Stem
California	3,296	67	8,621	2,182	1	1	42	36	22	1,215,146	3,564	102,468	1,002	2,502	30,564	1,303	1,561
Oregon	No data	1,571	52,202	No data	4	4	2,046	30,153	1,044	423,169	2,287	36,427	1,278	1,260	12,546	895	469
Total - -	3,296	2,328	60,823	2,182	5	5	2,088	30,191	1,066	1,638,315	6,851	138,915	2,280	3,762	43,110	2,208	2,032



MAPS OF ACTIVE CONTROL OPERATIONS SHOWING

THE STATUS OF BLISTER RUST CONTROL

1943

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### PART III

## COOPERATIVE BLISTER RUST CONTROL ON STATE AND PRIVATELY-OWNED LANDS

### Financial Project BLR-3-5

By

Carl W. Fowler, Forester, P-3

#### OBJECTIVE

The protection from white pine blister rust of the sugar pine stands growing on lands in state and private ownership in California and Oregon.

#### COOPERATORS

The project, operated under the leadership of the Bureau of Entomology and Plant Quarantine, may be participated in cooperatively by the States and other interested agencies, both public and private.

The State of California in 1943 appropriated \$100,000 for the control of white pine blister rust on state and privately-owned sugar pine timberlands, the money to be expended in the biennium ending June 30, 1945. The Memorandum of Agreement between the Bureau and the State of California defining the conditions of cooperation effective in 1942 was continued in force.

The three lumber companies who cooperated financially in the project in 1942 renewed their agreements with the Bureau and continued their financial aid in 1943. The Red River Lumber Company, the Diamond Match Company, and the Michigan-California Lumber Company each contributed \$2,000 to the project for the fiscal year 1944.

The funds contributed by the State of California and the cooperating lumber companies were matched with Federal funds allocated to the Bureau's Oakland office, and the combined funds financed the cooperative control project.

A new agreement was executed between the Bureau and the California State Division of Forestry giving the conditions under which blister rust employees and equipment may be used by the Division of Forestry in the suppression of forest fires.

The State of Oregon did not participate in the cooperative control project since no funds were made available by the State or by other agencies in Oregon for control work on state and privately-owned timberlands.

#### LOCATION AND ORGANIZATION OF WORK

Priority in the selection of areas to receive blister rust control work was given to those lands which had already received one or more treatments but which needed further attention this year. The remainder of the funds was to be spent on initial ribes eradication in high rust hazard areas. Because of the presence of the rust on or near the control units of the Plumas-Lassen operation a majority of the camps was concentrated on this operation. The Bureau operated eight camps on the project employing 325 men during most of the season.



# CAMPS ENGAGED IN COOPERATIVE RIBES ERADICATION IN 1943

National Forest	Location of Camp	Size of Camp	Operating Period
Lassen	Hatchet Mt.	40 men	June 16 to Aug. 29
	Rag Dump	40 men	June 23 to Sept. 1
	Mill Creek	50 men	June 15 to Sept. 6
	Humbug	50 men	May 15 to Oct. 12
Plumas	Frosty Hollow	45 men	June 24 to Sept. 1
Eldorado	Frosty Cabin	30 men	June 2 to Aug. 28
	Butcher's Corral	35 men	June 15 to Sept. 10
Stanislaus	Skull Creek	35 men	June 15 to Sept. 4
Total	8 Camps	325 men	

The normal supply of college students and local labor was no longer available as these men had been absorbed by either the armed forces or defense plants. To secure the needed labor for seven of the camps it was necessary to go into the high schools of the State and recruit teen-age boys, mostly in the 16 to 17-year age group. Inmates from Folsom State Prison were used to man one camp. School teachers were used as camp superintendents and foremen in many of the camps since most of the experienced supervisory personnel had been lost for the same reasons as the experienced labor. This setup resulted in starting operations in most of the camps with an inexperienced crew throughout. The camps were overmanned by approximately 30 per cent at the start of the season to offset an anticipated abnormal labor turnover. This was not sufficient for several of the camps; however, for the majority, the desired camp strength was maintained throughout the season. After the opening of the camps replacements were practically impossible to obtain.

The lack of experienced supervision and the extreme youthfulness of the crews created many new problems of administration and camp management. Prison crews, an altogether new type of labor, required special attention. Extended training periods and intensive supervision were necessary to produce acceptable results. The field season was abnormally short since the camp operations had to coincide with the school vacation, or roughly, from June 20 to August 31. Added to the difficulties encountered in the direction of the field work was the task of feeding the men adequately due to food rationing restrictions and a scarcity of capable cooks. Although the season's accomplishments were satisfactory, the work did not compare in quality and quantity to that of former years. Nonetheless it did meet the objective of keeping needed re-eradication up to date and of removing ribes from high-hazard areas. When judging the year's results, consideration must also be given to the investment made in trained workers, both labor and supervisory, that will be a dividend of experienced personnel for future work.

The season's output was reduced considerably by the increased demand on blister rust crews for fire fighting. The shortage of labor for fire suppression was so acute in some areas that the blister rust crews were the only available manpower for fire fighting. Consequently there was a loss of many man days to the eradication project. This was especially true on the Lassen National Forest where the crews spent 32 per cent of their total work time fighting fire. Both federal and state agencies requisitioned blister rust crews to assist in suppressing fires on lands under their jurisdiction, but the greater amount of time was spent on fires occurring on lands under the protection of the California State Division of Forestry.

SUMMARY OF MAN DAYS SPENT ON FIRE SUPPRESSION BY THE  
COOPERATIVE CREWS IN 1943

Operation	Man Days Spent Fighting Fires	Man Days on Ribes Eradication	Total Work Days	Per cent of Total Work Days Spent Fighting Fire
Lassen	3,497	7,404	10,901	32.1
Plumas	327	1,282	1,609	20.3
Eldorado	191	3,383	3,579	5.3
Stanislaus	229	1,453	1,682	13.6
Total	4,244	13,527	17,771	23.9

WORK PERFORMED AND RESULTS ACCOMPLISHED

Lassen National Forest

The crews from four camps were engaged in ribes eradication on the Lassen National Forest. The Humbug Valley camp with 50 inmates from Folsom State Prison began operations on May 15 and worked until the middle of October. The removal of the timber in this district between the years of 1936 and 1940 resulted in a heavy influx of ribes bushes and an excellent stand of sugar pine reproduction. The eradication efforts resulted in the initial treatment of 4,039 acres. The ground cover and topography were moderate and no particular difficulties were encountered. The Red River Lumber Company is the principal land owner in this tract.

The crews from the Hatchet Mountain, Rag Dump, and Mill Creek Camps were engaged entirely in removing ribes bushes from those areas where conditions for the incidence and development of blister rust are particularly favorable. The practice of removing ribes from along streams, roads, meadows, and other openings where they normally occur in concentrations is known as "spot working." Spot working has been adopted as a delaying measure to retard the development and spread of the rust, for such sites, in addition to supporting greatest numbers of ribes, also are spots where conditions for rust establishment and development are most favorable.

Ribes eradication performed by the 40-man crew from the Hatchet Mt. camp gave a high degree of protection to the sugar pine on one half of the area in this unit or approximately 7,000 acres. Several blister rust infection centers have been found in this unit and all known cankers were removed. Parts of the area have been logged while other portions support good stands of mature timber. The ground cover and topography offered no special problems. The principal land owner is the Red River Lumber Company.

The treatment given areas in the Flea Valley unit by the 40 youths from the Rag Dump camp gave a high degree of protection to the young sugar pine stands growing on 12,000 acres. The mature timber on most of this acreage was removed many years ago. The dense brush cover on the areas worked greatly impeded the progress of the crews. Two blister rust infection centers were found in this unit and the cankers and ribes at each center were removed. The Diamond Match Company is the principal land owner.

The crews from the 50-man camp at Mill Creek performed spot working ribes eradication on both initial and previously treated areas. Ribes eradication by this method gave a high degree of protection to the mature stands of sugar pine growing on 10,000 acres of this unit. The reeradication work was done in the Mill Creek Canyon and around Childs Meadows in the Deer Creek drainage. Areas treated initially were along Mill Creek and its tributaries. Large bushes of Ribes inerme entwined with dense clumps and thickets of willow brush were difficult to remove, and some brush slashing was necessary. The Collins Pine Company is the principal land owner.

#### Plumas National Forest

Spot working ribes eradication was continued on the Cascade-La Porte unit of the Plumas National Forest by the 45-man crew located at Frosty Hollow. By removing the ribes bushes from along roads, around old mines and orchards a total of 8,000 acres of mature sugar pine timber was given a high degree of protection from blister rust. The brush cover was dense and the topography steep and rugged. The many infected sugar pines and ribes found along Lost Creek were removed. Land ownership in this district is divided between the Levi-Greenwald interests and the Soper-Wheeler Lumber Company.

#### Eldorado National Forest

Ribes eradication work on the Eldorado National Forest was conducted on the Georgetown unit by the personnel from the two 35-man camps located at Davis Cabin and Butcher's Corral. The Davis Cabin crews completed initial treatment on 1,605 acres whereas the work of the Butcher's Corral camp was confined to a reeradication job on lands that received initial treatment in 1936. Of the 3,462 acres given a second ribes eradication, 1,103 acres were within the boundaries of the state-owned Blogett Experimental Forest. Except for 160 acres of mature timber on Silver Ridge the entire season's work was spent on cut-over lands. The ground cover and topography were moderate. Michigan-California Lumber Company is the principal land owner.

#### Stanislaus National Forest

The 35 youths from the Skull Creek Camp on the Stanislaus National Forest performed reeradication work on the south central portion of the Beaver Creek unit, which lies between the Middle Fork and the North Fork of the Stanislaus River. The area worked during 1943 had been logged over since the completion of the previous eradication work in 1938.

The influx of new bushes has been rapid on all sites where conditions are favorable for ribes regeneration, and treatment was limited to these areas that did support numerous ribes. The presence of large amounts of slash and debris on the ground caused a sharp reduction in the progress of the crews. The 2,850 acres that received treatment are owned almost exclusively by the Pickering Lumber Corporation.

#### Checking

Six checkers were employed for the season on the cooperative project. The combination of starting the field season with inexperienced men, an unusually short period for camp operation, and a shortage of checkers on one operation made it impossible to complete all the desired checking. Regular checking activities were curtailed in favor of the more essential advance and post

checking. Only 17 per cent of the checker man days spent on the project were devoted to regular checking. By this policy the men were able to perform the necessary advance and post checking work.

A summary of all advance, post, and regular checking on this project can be found in Table 3.

#### Summary of Ribes Eradication

Since the adoption of the practice of spot working in 1942 and its continued application on the northern operations in 1943 a total of 104,000 acres have been given partial protection. This departure from standard ribes eradication practices was necessary as a delaying measure to minimize the losses from blister rust until the complete control job can be accomplished. The present curtailed control program, due to wartime conditions, must necessarily give priority of work to the higher valued and more endangered areas. In other words, doing the work where the maximum protection can be secured with the minimum labor expenditure. Spot working gives a relatively high degree of protection and gives an exceedingly higher degree of protection to the whole area than would the same amount of work when confined to a single continuous area.

A total of 2,221,277 ribes was destroyed on 9,627 acres of initial work and 7,889 acres of reeradication with the 13,527 man days of labor expended on the cooperative project.

Tables 1 through 7 present in tabular form the results of the project, the status of cooperative funds as of December 31, 1943, and a summary of all control work on state and private lands.

Tables 1 and 4 include only that work done by the Bureau of Entomology and Plant Quarantine, whereas Tables 5 and 6 include work done by all agencies engaged in ribes eradication on state and private lands.

#### RECOMMENDATIONS

On all the operations first priority of work should be given to ribes re-eradication on areas supporting numerous bushes. The practice of spot working should be continued next season on those operations where blister rust infection centers are present or their probable occurrence imminent. Initial work should be confined to recently cut-over lands on which sufficient sugar pine reproduction is coming back to warrant protection and on which numerous ribes are becoming established. By working these areas as they need it, from one to several future reeradication jobs can be eliminated.

The work of the cooperative project has been and should continue to be directed toward (1) preventing the rust from becoming established at sites where conditions are highly favorable to rust development, (2) removing both cankers and ribes from all known infection centers to prevent rapid development of the disease, and (3) continuing the work on the over-all control program as rapidly as possible.





TABLE 1  
SUMMARY OF COOPERATIVE RIBES ERADICATION IN CALIFORNIA IN 1945\*

Control Operation	Acres			8-Hour Man Days	Ribes Eradicated	Per Acre Worked 8-Hour Man Days	Ribes	Ownership Status												Acres Ribes-free At Re- eradication
	Worked	Blocked Out	Total					Acres Covered			8-Hour Man Days			Ribes Eradicated						
								Federal	Private	State	Federal	Private	State	Federal	Private	State				
Initial Work																				
Lauren																				
National Forest	6,874		6,874	7,113	1,341,414	1.03	195	2,245	4,623		2,254	4,859		408,777	932,637					
Pinnas																				
National Forest	1,148		1,148	1,282	238,725	1.12	208	92	1,056		120	1,162		25,278	213,447					
Eldorado																				
National Forest	1,605		1,605	1,478	208,633	0.92	130		1,605			1,478			204,633					
Total - - - -	9,627		9,627	9,873	1,788,772	1.03	186	2,337	7,290		2,374	7,439		434,055	1,354,717					
Reeradication																				
Lauren																				
National Forest	1,577		1,577	291	60,622	0.18	38	258	1,319		45	246		7,524	53,038					
Eldorado																				
National Forest	3,462		3,462	1,910	147,458	0.55	43	140	2,219	1,103	59	1,468	383	1,680	127,112	18,706		1,258		
Stanislaus																				
National Forest	2,850		2,850	1,453	224,385	0.51	79	80	2,770		57	1,396		5,294	219,091			615		
Total - - - -	7,889		7,889	3,654	432,505	0.46	55	478	6,308	1,103	161	3,110	383	14,558	399,841	18,706		1,673		
All Workings																				
Lauren																				
National Forest	8,451		8,451	7,404	1,402,016	0.88	166	2,503	5,948		2,259	5,105		416,361	985,675					
Pinnas																				
National Forest	1,148		1,148	1,282	238,725	1.12	208	92	1,056		120	1,162		25,278	213,447					
Eldorado																				
National Forest	5,067		5,067	3,366	356,131	0.67	70	140	3,824	1,103	59	2,946	383	1,680	335,745	18,706		1,258		
Stanislaus																				
National Forest	2,850		2,850	1,453	224,385	0.51	79	80	2,770		57	1,396		5,294	219,091			615		
Total - - - -	17,516		17,516	13,527	2,221,277	0.77	127	2,815	13,598	1,103	2,535	10,609	383	448,613	1,753,958	18,706		1,673		

\*No cooperative work done in Oregon.

TABLE 2  
SUMMARY OF COOPERATIVE RIBES ERADICATION IN CALIFORNIA 1941-1943\*

Control Operation	Acres			5-Hour Man Days	Ribes Eradicated	Per Acre Worked		Ownership Status								Acres Ribes-free at Re- eradication
	Worked	Blocked Out	Total			Acres Covered			5-Hour Man Days			Ribes Eradicated				
						Federal	Private	State	Federal	Private	State	Federal	Private	State		
Initial Work																
Lauren																
National Forest	7,247		7,247	8,017	1,574,308	1.02	201	2,283	5,564		2,271	5,746		418,628	1,355,620	
Pinnas																
National Forest	3,158		3,158	3,268	852,246	1.03	270	1,082	2,076		1,297	1,971		325,041	527,205	
Eldorado																
National Forest	5,500	430	5,930	3,901	653,622	0.71	119	460	5,470		283	3,618		39,950	613,672	
Total - - - -	16,505	430	16,935	15,186	3,080,176	0.92	187	3,825	13,110		3,851	11,335		783,619	2,296,557	
Reeradication																
Lauren																
National Forest	6,980		6,980	2,075	312,458	0.30	45	658	6,322		177	1,898		26,220	286,238	1,106
Pinnas																
National Forest	547		547	85	18,304	0.16	33		547			85			18,304	
Eldorado																
National Forest	6,048		6,048	2,762	285,216	0.42	103	556	4,980	1,103	245	2,134	383	33,633	232,877	18,706
Stanislaus																
National Forest	11,903		11,903	3,522	444,201	0.30	37	1,742	10,161		358	3,164		35,580	408,621	1,665
Calaveras Big Trees State Park																
	1,125		1,125	466	22,525	0.41	20		75	1,050		20	446		722	21,803
Total - - - -	27,203		27,203	8,910	1,082,704	0.33	40	2,965	22,085	2,153	780	7,301	829	95,433	946,768	40,509
All Workings																
Lauren																
National Forest	14,827		14,827	10,092	1,886,766	0.58	127	2,941	11,885		2,448	7,944		444,848	1,441,918	1,106
Pinnas																
National Forest	3,705		3,705	3,353	870,550	0.90	235	1,082	2,623		1,297	2,056		325,041	545,509	
Eldorado																
National Forest	12,148	430	12,578	6,663	938,838	0.55	77	1,025	10,450	1,103	528	5,752	383	71,583	846,544	18,706
Stanislaus																
National Forest	11,903		11,903	3,522	444,201	0.30	37	1,742	10,161		358	3,164		35,580	408,621	1,665
Calaveras Big Trees State Park																
	1,125		1,125	466	22,525	0.41	20		75	1,050		20	446		722	21,803
Total - - - -	43,708	430	44,138	24,096	4,162,880	0.55	95	6,790	35,195	2,153	4,631	18,616	829	879,052	1,243,319	40,509

\*No cooperative work done in Oregon.





TABLE 3

## SUMMARY OF REGULAR, ADVANCE, AND POST CHECKING ON THE COOPERATIVE PROJECT - 1943

Operation	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days
California												
Plumas - Lassen	-	-	-	1,850	2.9	20 1/8	-	-	-	1,850	2.9	20 1/8
Stanislaus	2,200	2.8	33 2/8	-	-	-	4,750	3.6	91 6/8	6,950	3.4	125
Eldorado	1,850	2.8	27 5/8	-	-	-	7,870	3.1	135 7/8	9,730	3.0	163 4/8
Sierra	-	-	-	-	-	-	5,708	2.4	47 2/8	5,708	2.4	47 2/8
Total	4,060	2.8	60 7/8	1,850	2.9	20 1/8	18,338	3.0	274 7/8	24,258	3.0	355 7/8

N.B.-No cooperative work performed in Oregon during 1943.  
Kings Canyon National Park financed by bureau.







TABLE 5  
(Continued Table 3)

SUMMARY OF RIBES REGRADATION ON STATE AND PRIVATE LAND IN 1943

State	Initial Work			Reproduction Work			Total		
	Number Arrested	Number Busted	Number Man Days	Number Arrested	Number Busted	Number Man Days	Number Arrested	Number Busted	Number Man Days
California	13,812	2,571,657	16,750	14,095	877,596	6,009	7,797	1,344,253	22,719
Oregon	2,065	442,216	572	475	2,494	275	2,618	1,493,763	887
Total -	15,877	2,613,266	17,322	14,569	876,390	6,284	10,415	1,493,666	23,606

TABLE 6  
(Continues Table 4A)

State	Average of White Pine Control Area	Best Control Area		Initial Radiation Note		Sporadic Note					Total				
		Gross Average Total Area	Gross Average Best Area	Gross Average Control Area	Gross Average Control Area	Gross Average Control Area	Gross Average Control Area	Gross Average Control Area	Gross Average Control Area	Gross Average Control Area	Gross Average Control Area	Gross Average Control Area			
California	876,735	999,895	334,046	185,680	157,893	1,902,141	15,118	9,158,152	63,716	149,950	325,610	140,141	15,238	53,148,469	293,135
Oregon	166,175	168,175	61,619	106,560	125,268	12,482	475	175,255	2,088	119,297	105,540	12,182	475	1,950,955	37,196
State --	1,044,910	811,900	441,006	413,770	275,808	158,133	15,733	9,333,677	85,484	609,712	433,770	15,157	15,733	6,112,694	311,152



TABLE 7

STATUS OF COOPERATIVE FUNDS FOR RIBES ERADICATION ON STATE AND PRIVATE LANDS  
IN CALIFORNIA - JULY 1, 1941 TO DECEMBER 31, 1943

Cooperative Funds		Accumulative Expenditures 7/1/41 - 12/31/42	Expenditures Calendar Year 1943	Available Balances as of 1/1/44
<b>State &amp; Private Cash Contributions:</b>				
State of California*	\$100,000	\$ 35,636	\$ 24,033	\$ 40,331
Michigan-Calif. Lumber Co.**	4,000	1,951	-	2,049
Red River Lumber Co.**	4,000	1,952	-	2,048
Diamond Match Co.**	4,000	1,997	-	2,003
Total	\$112,000	\$ 41,536	\$ 24,033	\$ 46,431
<b>Federal Allotments (Lea Act Only):</b>				
1942 Fiscal Year	14,625	14,612	-	-
1943 Fiscal Year***	71,770	38,150	33,228	-
1944 Fiscal Year	75,695	-	63,264	12,431
Total (Project 3103.14)	162,090	64,312	96,492	12,431
Grand Total	\$274,090	\$ 105,848	\$ 120,525	\$ 58,862

\*Consists of \$50,000 appropriated for the 1941-43 biennium plus \$50,000 of the \$100,000 appropriated for the biennium 1943-45. Additional \$50,000 not yet deposited with Treasurer of the United States for expenditure.

\*\*Consists of \$2,000 each for fiscal years 1943 and 1944.

\*\*\*Original allotment of \$64,695 augmented late in the fiscal year by an additional \$7,075 from Deficiency Appropriation Bill for overtime.

\* \* \* \* \*

NOTE: Funds in the amount of \$34,215 were expended in 1943 for emergency fire suppression at the call of the State Division of Forestry and the U. S. Forest Service. These agencies reimbursed blister rust control funds for the expenses incurred - \$24,724 from the State and \$9,491 from the U. S. Forest Service. These amounts were credited back to the funds from which expended and are included above as part of the balances available for expenditures. The time spent fighting fire, by reducing the budgeted program for blister rust control, caused a lesser amount of contributed funds to be expended than was planned. However, the unexpended balances plus additional cash contributions and Federal appropriations anticipated for expenditure after June 30, 1944 will finance the 1944 calendar year program.





## PART IV

### BLISTER RUST CONTROL BY THE FOREST SERVICE

#### Financial Project BLR-4

By

Benton Howard, Forester, P-3

#### PURPOSE

This project has been established for the protection of white pines from white pine blister rust on federal lands administered by the United States Forest Service.

#### COOPERATION

The blister rust control program of the Forest Service was conducted under the same general plan as previously followed. The cooperative agreements of the Bureau of Entomology and Plant Quarantine with Region 5 and with Region 6 of the Forest Service were continued. Under the terms of these agreements the Bureau and each forest actively engaged in a ribes eradication program established cooperative agreements to meet specific needs.

Due to the shortage of experienced personnel, the Bureau's technical supervisors assisted in the administration of the Forest Service camps on the Siskiyou National Forest in Region 6 and on the Klamath, Eldorado, Stanislaus, and Sierra National Forests in Region 5. Mr. E. H. Kincaid, of the Supervisor's staff, supervised the Forest Service camps on the Plumas National Forest. Mr. Charles R. King was assigned by the Forest Service from May 1 to September 30 to supervise the camps on the Rogue River National Forest.

#### ORGANIZATION AND LOCATION OF THE WORK

##### Ribes Eradication

The Forest Service operated four camps on two national forests in Region 6 and eleven camps on five national forests in Region 5. Four of these camps, all in California, were manned by inmates from San Quentin and Folsom prisons. The men secured from the prisons were not accustomed to hard physical effort and were slow in becoming conditioned to woods work. The use of prison labor created special problems, since some communities were resentful of the presence of convicts nearby. The remaining eleven camps were manned almost entirely by youths of 16 to 18 years of age. These youths were inexperienced in any type of woods work and in most instances were devoid of any work experience. Many of the camp superintendents and nearly all of the camp foremen were inexperienced and in a few camps every employee was new to blister rust work.

The quality and quantity of the work performed by the high school students and the prisoners were about the same, and were considerably under that of previous years.

The personnel of the camps was given systematic training not only in blister rust work but also in fire fighting, woodsmanship, and in camp procedures.

The training of so many inexperienced persons was one of the principal problems of the season.

### Rogue River National Forest

Three 33-man camps, manned almost entirely by high school youths, were operated by the Rogue River National Forest from the middle of June until the end of August. The crews were engaged in the eradication of ribes from the Upper Rogue River unit. Those portions of the area previously treated and on which ribes had sufficiently regenerated to endanger the pine, were reworked. These areas were limited in extent and were mostly along the streams and roads. Initial work was done along those streams adjacent to the control unit on which Ribes bracteosum bushes were present. This was done to protect the white pines just inside the control unit boundaries because R. bracteosum, which grows along many streams in the area, can produce a large volume of sporidia capable of infecting white pines at a much greater distance than the sporidia produced by any other wild ribes of the sugar pine belt.

### Siskiyou National Forest

This year marked the beginning of Forest Service blister rust control work on the Siskiyou National Forest. Ribes eradication work was started on the Bolan Lake unit on the southern part of the Forest. The labor was all of high school age and a 50-man camp was in operation from June 10 until the end of August. Initial ribes eradication was performed on approximately one third of this unit. The area supports a fair to good stand of sugar pine with a very dense understory of brush, which greatly slowed the progress of the work.

Infected sugar pines were found along most of the streams throughout the unit but no heavy infection centers were discovered.

### Klamath National Forest

Two 50-man camps continued the initial eradication of ribes from the control units of the Klamath National Forest. The camps were in operation from early in May until the middle of October, with the personnel being secured from San Quentin prison. The project lost many man days because of rain during the spring and fire fighting in the fall.

The Beaver Creek camp continued with the working of cut-over lands which supports numerous ribes. Infected sugar pines are scattered throughout this area and infection conditions are favorable for the intensification of the rust and resultant damage to the sugar pine stand.

The Cinnabar Springs camp commenced the initial eradication of ribes from the Cinnabar Springs unit. This area supports a good stand of mature sugar pine which is now being logged. Ribes are generally present, but are not very numerous except along the streams. Nearly all the stream type and approximately 2,200 acres of the timber type were covered. There were very few infected sugar pines discovered on this unit. In addition the camp removed ribes from along several streams in the adjacent Horse Creek unit, where numerous infected sugar pines and ribes were present.

### Plumas National Forest

Five 40-man ribes eradication camps were in operation on the Plumas National Forest during the season. The first camp opened on May 1 and the last camp was closed late in October. The labor for one camp was secured from Folsom Prison, while the labor for the other four camps was secured from various high schools. In July the high school youths were placed in three of the camps and the camp thus vacated was manned by itinerant labor secured from Reno and Sacramento.

The Big Bar camp reworked all areas in that unit on which considerable ribes regeneration had occurred. The camp was then moved to Granite Basin and from there continued with the initial eradication of ribes from cut-over lands adjacent to those previously treated.

One camp was located in Meadow Valley and worked those portions of the lands recently cut over on which ribes had appreciably regenerated. In addition some older cut-over areas were treated. Most of this unit has had two previous workings.

The three camps in the Greenville-Almanor unit were engaged in the eradication of ribes from areas previously worked. All areas logged between 1937 and 1940, and on which ribes had regenerated to the point of producing appreciable amounts of seed, were covered. In the vicinity of Lake Almanor and Butt Lake, all old cut-over areas which had received only an initial ribes eradication were reworked.

### Eldorado National Forest

The Forest Service operated a 33-man camp at Caldor on the Eldorado National Forest during the 1943 season. The camp labor was recruited from the high school age group.

Those portions of the cut-over lands of the Caldor unit on which numerous ribes had become reestablished were reworked. This area had last been treated in 1938 and 1939.

### Stanislaus National Forest

The Stanislaus National Forest operated two camps, one at Hazel Green in the Carl Inn unit and one on Jawbone Creek in the Woods Ridge unit.

The Hazel Green crews were composed of teen-aged youths and the camp was open from the middle of June until late in August. The Jawbone camp, manned by inmates from Folsom Prison, worked on ribes eradication from May 19 until October 15.

A second working of areas treated initially in 1936 and in 1940 was performed by the Hazel Green crews. The area was cut over from 1936 to 1939 and large quantities of logging slash greatly hampered the progress of the work. Some extremely steep slopes also added to the difficulties of the crews. As a result of the logging disturbance ribes bushes were very numerous throughout the camp area. Approximately one half of the cut-over lands needing treatment was covered this season.

The Jawbone camp did some work on areas which were initially treated during 1936. The rest of the season was spent on the initial working of areas recently cut over. The ribes here were very numerous and the individual bushes were exceedingly large and difficult to remove, consequently progress was slow. Topography is moderate throughout the Jawbone camp area. An excellent residual stand of young sugar pine is present on these cut-over lands.

### Sierra National Forest

The camps at Miami and Summit Camp operated by the Sierra National Forest were reoccupied and manned by 16 to 18-year old youths. They continued the reeradication work on the troublesome Chowchilla Mountain and Miami areas where ribes regeneration has been exceedingly persistent.

Brush, particularly Ceanothus cordulatus, has become extremely dense since logging and presents a difficult problem in ribes eradication. It was necessary to provide special canvas leg guards to protect the workers from thorn injuries.

### Summary of Ribes Eradication

The initial coverage of national forest lands is 33 per cent complete as of December 31, 1943. The crews on the Klamath National Forest in California and the Siskiyou National Forest in Oregon confined their efforts to initial ribes eradication. The work on the other forests was almost entirely ribes reeradication and the reworking of troublesome areas has been kept up to date.

The detailed results of the season's work are summarized on pages 51, 53, and 54.

### Checking

The checking of areas worked by the Forest Service camps was supervised by the Bureau's checking supervisors in accordance with the Memoranda of Agreement. Nearly all the 1943 work areas which required a post or an advance check were covered. The scarcity of checkers prevented the regular checking of many areas worked during the season. Checking accomplishments are summarized on page 52.

### EXPENDITURES

The funds expended by the Forest Service were allotted from the Agriculture Appropriation Acts for the fiscal years of 1943 and 1944. During the calendar year of 1943 \$233,647.63 were spent in California and \$76,272.78 in Oregon.

### RECOMMENDATIONS

All ribes eradication work during 1944 should be limited to three classes of areas.

1. Those areas previously treated, which ribes regeneration has occurred to such an extent that any further delay may increase the number of workings necessary to secure permanent ribes suppression.

2. Those areas on which only a few infected sugar pines are present, and where it is probable that the spread of the rust can be greatly retarded by the removal of ribes from a few selected places.
3. Those areas on which white pine blister rust is present and ecological conditions indicate that the intensification of the rust and its spread throughout the area is about to occur.





TABLE 1  
SUMMARY OF RIBS RADICATION BY THE FOREST SERVICE IN 1943

National Forest	Acres			Per Acre Worked		Ownership Status										Acres Ribes-Free At Re- radiation			
	Worked	Blacked Out	Total	6-Hour Men Days	Ribes Radicated	Acres Covered			6-Hour Men Days			Ribes Radicated			Private				
						Federal			Federal			Federal							
						National Forest	O & C	Private	National Forest	O & C	Private	National Forest	O & C	Private					
Initial Work																			
California:																			
Foothills	5,069		5,069	5,435	346,668	1,031	73	547	547	4,722	436	436	4,999	41,576	41,576	346,112			
Lessons	3,408		3,408	785	608	63	63	592	592	3,130	263	263	3,393	72,734	72,734	608			
Sierra	1,840		1,840	1,135	861,716	532	464	1,096	1,096	1,820	436	436	2,526	11,220	11,220	861,716			
Subtotal - - -	7,524		7,524	10,359	1,352,992	1,277	166	1,735	1,735	5,662	945	945	5,931	115,526	115,526	1,352,992			
Oregon:																			
Bonne River	282		282	528	103,474	131	104	270	270	22	603	603	29	100,014	100,014	2,463			
Astoria	1,382	2,225	3,607	1,660	69,525	1,112	48	1,463	720	2,432	1,435	1,435	28	62,486	1,466	2,466			
Subtotal - - -	1,664	2,225	3,889	2,188	172,999	1,243	152	2,432	990	2,454	1,468	1,468	57	162,500	1,468	2,468			
Total - - - - -	5,788	2,225	11,578	12,547	1,525,991	1,418	318	3,488	2,720	8,138	1,710	1,710	1,162	280,222	1,162	3,222			
Re-radiation																			
California:																			
Foothills	12,345		12,345	5,472	1,010,938	0.40	82	5,077	5,077	6,949	3,433	3,433	2,329	603,777	603,777	407			
Lessons	1,308		1,308	785	82,855	0.50	81	1,491	1,491	3,720	1,711	1,711	28	14,626	14,626	81			
Sierra	1,250		1,250	1,391	259,013	0.71	163	1,490	1,490	1,386	1,386	1,386	1,075	251,540	251,540	1,386			
Subtotal - - -	14,903		14,903	7,648	1,350,806	0.61	246	8,058	8,058	12,055	6,530	6,530	4,432	860,943	860,943	246			
Oregon:																			
Bonne River	3,305		3,305	3,280	200,453	0.99	61	2,431	2,431	475	1,046	1,046	230	127,456	127,456	230			
Total - - - - -	18,208		18,208	10,928	1,551,259	0.60	307	10,489	10,489	7,134	11,707	11,707	2,735	1,010,168	1,010,168	307			
All Workings																			
California:																			
Foothills	17,873		17,873	5,955	346,668	1,031	73	927	927	4,722	436	436	4,999	41,576	41,576	346,112			
Lessons	4,716		4,716	1,570	608	63	63	1,482	1,482	3,130	263	263	3,393	72,734	72,734	608			
Sierra	3,090		3,090	2,525	861,716	532	464	2,688	2,688	1,820	436	436	2,526	11,220	11,220	861,716			
Subtotal - - -	25,679		25,679	10,050	1,350,992	1,626	200	4,100	4,100	9,672	1,135	1,135	8,858	64,530	64,530	1,350,992			
Oregon:																			
Bonne River	3,587		3,587	3,208	200,453	0.99	61	3,101	3,101	497	1,046	1,046	260	127,456	127,456	260			
Astoria	1,463	2,225	3,688	1,660	69,525	1,112	48	1,463	720	2,432	1,435	1,435	28	62,486	1,466	2,466			
Subtotal - - -	5,050	2,225	10,275	4,868	269,978	2,124	109	4,564	3,820	2,909	2,481	2,481	288	189,942	1,895	2,926			
Total - - - - -	11,503	2,225	13,728	8,128	1,620,970	0.60	319	10,024	10,024	10,407	12	10,407	12,037	1,020,160	1,025	3,252			

TABLE 2  
SUMMARY OF RIBS RADICATION BY THE FOREST SERVICE 1933-1943

National Forest	Acres			Per Acre Worked		Ownership Status										Acres Pine-Free At Re-radiation	
	Worked	Blacked Out	Total	6-Hour Man Days	Ribes Radicated	Acres Covered			6-Hour Man Days Federal			Ownership Status			Ribes Radicated Federal		
						National Forest	O & C	Private	National Forest	O & C	Private	National Forest	O & C	Private			
Initial Work																	
California:																	
Foothills	14,461	833	15,294	11,845	1,153,856	0.94	79	3,745	3,745	11,708	2,701	2,701	10,497	376,661	376,661	777,804	
Lessons	17,638		17,638	10,587	1,930,142	0.58	110	9,748	15,371	2,668	2,668	14,968	502,187	502,187	1,042,131	5,121	
Sierra	37,068	9,151	46,219	27,621	69,838,572	1.00	158	37,009	37,009	3,137	6,078	6,078	13,918	2,084,522	2,084,522	69,838,572	
Subtotal - - -	69,167	10,984	80,151	39,453	89,292,568	0.82	247	40,762	40,762	30,216	11,447	11,447	39,483	1,363,370	1,363,370	849,675	
Oregon:																	
Bonne River	11,920	9,121	21,041	20,818	7,779,582	0.96	133	5,125	5,125	22,566	6,000	6,000	18,566	2,084,522	2,084,522	7,779,582	
Astoria	1,382	2,225	3,607	1,660	69,525	1,112	48	1,463	720	2,432	1,435	1,435	28	62,486	1,466	2,466	
Subtotal - - -	13,302	11,346	24,648	22,478	7,849,107	0.96	181	6,588	5,845	24,998	6,038	6,038	18,594	2,147,008	2,147,008	7,849,107	
Total - - - - -	82,469	22,330	104,799	61,931	97,141,675	0.82	428	47,350	46,607	55,214	12,484	12,484	58,077	3,510,378	3,510,378	928,782	
Re-radiation																	
California:																	
Foothills	8,772		8,772	2,346	204,095	0.49	43	627	627	1,157	261	261	2,095	5,014	5,014	199,081	5,121
Lessons	6,058		6,058	3,056	267,340	0.50	87	3,746	3,746	2,258	2,621	2,621	2,162	1,124,855	1,124,855	267,340	
Sierra	36,021		36,021	40,612	86,661	0.61	81	36,464	36,464	17,567	10,988	10,988	14,082	1,048,034	1,048,034	86,661	
Subtotal - - -	50,851		50,851	46,014	357,496	0.53	131	40,837	40,837	19,724	13,671	13,671	16,259	1,263,903	1,263,903	357,496	
Oregon:																	
Bonne River	8,416		8,416	8,416	204,095	0.88	73	4,341	4,341	475	1,007	1,007	235	146,514	146,514	2,043	
Astoria	1,463		1,463	1,660	69,525	1,112	48	1,463	720	2,432	1,435	1,435	28	62,486	1,466	2,466	
Subtotal - - -	9,879		9,879	10,076	273,620	0.89	121	5,804	5,804	1,507	1,442	1,442	263	209,000	209,000	2,469	
Total - - - - -	20,735		20,735	18,552	627,116	0.61	252	46,641	46,641	21,231	15,118	15,118	16,522	1,472,903	1,472,903	359,965	
All Workings																	
California:																	
Foothills	14,461	833	15,294	11,845	1,153,856	0.94	79	3,745	3,745	11,708	2,701	2,701	10,497	376,661	376,661	777,804	
Lessons	22,697		22,697	13,643	33,672	1,558,482	0.58	197	13,494	27,629	2,668	2,668	17,130	514,819	514,819	3,336,131	5,121
Sierra	37,068	9,151	46,219	27,621	69,838,572	1.00	158	37,009	37,009	3,137	6,078	6,078	13,918	2,084,522	2,084,522	69,838,572	
Subtotal - - -	74,226	10,984	85,210	49,489	81,650,900	0.82	295	40,762	40,762	30,216	11,447	11,447	39,483	1,363,370	1,363,370	849,675	
Oregon:																	
Bonne River	12,381	9,121	21,502	20,818	7,779,582	0.96	133	5,125	5,125	22,566	6,000	6,000	18,566	2,084,522	2,084,522	7,779,582	
Astoria	1,463	2,225	3,688	1,660	69,525	1,112	48	1,463	720	2,432	1,435	1,435	28	62,486	1,466	2,466	
Subtotal - - -	13,844	11,346	25,190	22,478	7,849,107	0.96	181	6,588	5,845	24,998	6,038	6,038	18,594	2,147,008	2,147,008	7,849,107	
Total - - - - -	88,070	22,330	110,400	71,966	89,500,007	0.82	476	53,350	52,607	60,214	12,522	12,522	58,077	3,510,378	3,510,378	928,782	

Includes 590 acres, 1,677 man days, and 403,900 Ribes worked by the Forest Service now in Yosemite National Park.



TABLE 3

## SUMMARY OF REGULAR, ADVANCE AND POST CHECKING ON THE FOREST SERVICE PROJECT - 1943

Operation	Regular Check			Advance Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days
Oregon												
Rogue River	2,818	5.7	87	240	5.0	4	13,375	4.9	290 5/8	16,433	5.1	381 6/8
Siskiyou	733	5.1	16 7/8	5,134	5.0	116 7/8	-	-	-	5,867	5.0	133 6/8
Total	3,551	5.6	103 7/8	5,374	5.0	120 7/8	13,375	4.9	290 5/8	22,300	5.0	515 4/8
California												
Klamath	4,228	4.4	86 3/8	3,239	3.2	39 1/8	-	-	-	7,467	3.9	125 4/8
Plumas - Lassen	438	4.1	8 4/8	479	2.9	9 7/8	19,266	2.8	200 5/8	20,183	2.8	219
Stanislaus	2,365	2.5	32 2/8	2,780	1.4	26 5/8	3,790	2.4	37 6/8	8,935	2.1	96 5/8
Eldorado	160	2.5	1 3/8	620	3.4	15 1/8	4,300	2.7	61 1/8	5,080	2.8	77 5/8
Sierra	2,124	5.4	90 5/8	-	-	-	928	2.9	15 7/8	3,052	4.7	106 4/8
Total	9,315	4.1	219 1/8	7,118	2.5	90 6/8	28,284	2.7	315 3/8	44,717	3.0	625 2/8
Sugar Pine Region												
Total	12,866	4.5	323	12,492	3.5	211 5/8	41,659	3.4	606 1/8	67,017	3.7	1,140 6/8



ESTIMATES OF RISES IN FOREST LAND IN 1943

[illegible]

(Only in Table 4A)

RECORD OF BIRDS ERADICATION ON NATIONAL FOREST LAND 1925-1943 (INCLUSIVE)

(Only in Table 4A)

[illegible]



TABLE 6

## SUMMARY OF RIBES ERADICATION BY AGENCY ON NATIONAL FOREST LAND 1925-1943

Acreage of National Forest Land in Control Area	Year	Acreage Worked By						Total Acreage Worked According To Present Ownership (Initial Erad.)		Unworked Acreage	
		Forest Service			Bureau			O & C			
		Initial Work	Reeradi- cation	Total	Initial Work	Reeradi- cation	Total	Initial Work	Reeradi- cation		Total
California											
884,272	1926 to 1942										
	1942	164,673	130,257	294,930	114,759	42,071	156,830		279,432	172,328	451,760
	1943	1,372	11,779	13,151	2,337	478	2,815		3,709	12,257	15,966
Total - -	- -	166,045	142,036	308,081	117,096	42,549	159,645		283,141	184,585	467,726
Oregon											
225,127	1925 to 1942										
	1942	680	1,722	2,402	78,165	22,676	100,841	6,846	85,691	24,398	110,089
	1943	2,112	2,831	4,943	-	-	-	1,900	4,012	2,831	6,843
Total - -	- -	2,792	4,553	7,345	78,165	22,676	100,841	8,746	89,703	27,229	116,932
Total											
Sugar Pine Region											
1,109,399		168,837	146,589	315,426	195,261	65,225	260,486	8,746	372,844	211,814	584,658

\*Excludes 2,609 acres of initial work in abandoned Mt. Hood Unit.





## PART V

### BLISTER RUST CONTROL BY THE NATIONAL PARK SERVICE

Financial Project BLR-5

By

Frank A. Patty, Pathologist, P-3

#### OBJECTIVE

The objective of the blister rust control project is to protect from white pine blister rust the white pine stands, which have high recreational, aesthetic or other park values, growing on National Park Service lands. To attain the objective ribes plants must be suppressed wherever five-needled pines are to be maintained in the stand.

#### COOPERATIVE AGREEMENTS

The cooperative agreements between Yosemite and Sequoia National Parks and the Bureau of Entomology and Plant Quarantine approved in 1942 were continued in 1943. A similar agreement was made with Lassen Volcanic National Park and became effective in 1943.

#### LOCATION AND ORGANIZATION OF WORK

The National Park Service established three major priority classifications for the five-needled pine areas as a guide for allotting funds to the various national parks. They are, briefly, as follows:

- A. Areas of intensive use or aesthetic value, having a large percentage of five-needled pines.
- B. Extensive areas with a high percentage of five-needled pines or scientific values for museum pieces, but not necessarily of high use.
- C. Other areas in which five-needled pines constitute an important component of the stand.

Areas in Class A will have priority over those in Class B, and areas in Class B over those in Class C. Ribes eradication work will be completed on lands in both A and B classes before any work is started on Class C lands.

The table on the following page gives a summary of the different classes and the acreage in each class that has been worked.

The National Park Service operated four blister rust control camps in the Sugar Pine Region, located as follows: two in Yosemite and one each in Sequoia and Lassen Volcanic National Parks.

THE STATUS OF RIBES ERADICATION IN THE NATIONAL PARKS OF THE  
SUGAR PINE REGION BY PRIORITY CLASSES AS OF DECEMBER 31, 1943

National Park	Total All Classes Acres	CLASS A				CLASS B				CLASS C	
		Total Acres	Un- worked Acres	Initial Working Acres	Reerad- ication Acres	Total Acres	Un- worked Acres	Initial Working Acres	Re- erad. Acres	Total Acres	Un- worked Acres
Yosemite	146,700	77,400	23,562	53,838	10,604	34,600	30,918	3,682	330	34,300	34,300
Sequoia	99,900	21,103	11,220	9,880	-	50,600	50,600	-	-	28,200	28,200
Kings Canyon	22,439	18,430	15,189	3,241	-	4,000	4,000	-	-	-	-
Lassen	17,932	11,563	4,042	7,521	1,665	6,369	-	6,369	310	-	-
Crater	3,782	3,782	150	3,632	350	-	-	-	-	-	-
Grand Totals	290,344	132,275	54,163	78,112	12,619	95,569	85,518	10,051	640	62,500	62,500

Superintendent James V. Lloyd of Lassen Volcanic, Assistant Superintendent D. J. Tobin of Sequoia, and Park Forester Emil F. Ernst of Yosemite gave general direction to the project in their respective parks. Foresters Burnett Sanford and Maurice Thede of the San Francisco Regional Office worked out many of the involved administrative problems. Park Service personnel trained the blister rust crews for fire fighting and gave instructions in safety, use of fire tools, first aid, and general conduct in the woods. The Bureau's representatives supervised the eradication work in the field and gave over-all supervision to checking.

With the exception of a few local men, labor was recruited from the 16 and 17-year old group of high school youths. The supervision, except for two or three foremen, were selected from high school teaching staffs. Most of the personnel came from the San Francisco Bay Area and San Joaquin high schools, although a few came from schools in southern California and Arizona. None of the youths were experienced in blister rust control work and only a few had ever done any kind of manual labor. Ailments common to young men of this age group resulted in the loss of considerable time in the field. They responded rather slowly to conditioning and training and as a result, the season was well along before anything like normal production for this type of labor really began. The teachers needed special training since they had no more woods experience than the youths they were supervising.

With so few experienced men, the camps required more frequent inspections and the field work closer supervision than had been necessary with ordinary labor and supervision. In spite of the handicaps good progress was made in all of the camps and many foremen and eradicators received training and experience that will be of value to the blister rust control project next season.

The Park Service blister rust control camps were fortunate in that they lost only a few days fighting forest fires.

The management of the kitchen and mess hall in Sequoia National Park was let to a contractor, while Yosemite and Lassen Volcanic National Parks managed their own. The subsisting of the men was complicated by food rationing, scarcity of certain staple foods like butter, fresh meat, eggs, smoked meats, and jam; as well as difficulty in securing reliable cooks and kitchen help.

#### WORK PERFORMED AND RESULTS ACCOMPLISHED

##### Lassen Volcanic National Park

The Park Service operated a fifty-man blister rust control camp at Lost Creek from June 21 to August 23. This was the first season that regular funds had been used, as all previous work was done with CCC allotments. A survey of the treated areas showed that only parts of the units needed attention. For this reason a second treatment was given to parts of the Manzanita Lake unit, a sugar pine area; the Sulfur Works unit, a western white pine area; and on the White Mountain unit, a western white and white bark pine area. The only difficult eradication problem was presented by the Lost Creek Ridge country, which at the time of initial ribes eradication supported a dense ribes population. Ribes regeneration was greater here than at any other place in the

Park. The terrain was steep and rough being made up of a jumble of gigantic boulders. Many of the ribes grew in crevices in these boulders, and to kill the plants it was necessary to cut off the tops and drench the roots and crowns with diesel oil.

Checking work was confined almost entirely to post checking those areas which had been initially worked in 1938, 1939, and 1940. Two checkers were assigned to the Park for a five-week period, and they covered 4,144 acres of post check and 160 acres of regular check.

On October 10, 1943 infected Ribes roezli plants were discovered along King's Creek approximately three quarters of a mile inside the park boundary. An intense search of nearby pines failed to reveal any cankers. The presence of the disease makes it imperative that initial work be completed as soon as possible and that reworking be kept up to schedule.

The blister rust control camp in Lassen Volcanic National Park spent 1,080 man days removing 99,128 ribes from 1,975 acres.

#### Yosemite National Park

The Park Service operated two blister rust control camps in Yosemite National Park; a sixty-man camp at Crane Flat from June 25 to September 13 and a forty-man camp at Eight Mile from May 15 to September 2. However, the effective working period or the time which the camp had a normal complement of men was actually much shorter: approximately June 25 to August 15. Compared to other blister rust control camps throughout the state the personnel turnover in Yosemite National Park was exceptionally high. The average work time per man employed during the season was twenty-five man days.

The Eight Mile camp worked the lands in the vicinity of Wawona and South Entrance. This camp performed reeradication work on areas that had been initially covered in 1938.

Except for a few places which supported dense brush the Eight Mile camp area offered no special eradication problems. This camp had originally been scheduled to occupy the old CCC buildings at Wawona, but the army took them over a few days before the blister rust crews were ready to occupy them.

The Crane Flat camp spent part of its time in giving initial control treatment to cut-over lands on Trumbull Ridge where the ribes population proved to be dense while the individual bushes were exceedingly large. On a small part of the area ribes bushes were so large and densely grown that they were eliminated from crew work and later in the season a ribes grapple hook powered by a drum on a caterpillar tractor was used to remove the bushes. Some reeradication work was done on an area adjacent to Trumbull Ridge. The chief obstacle in this job was the dense cover of brush on the ground which slowed down the crews searching for the smaller bushes. It is essential to find and remove these smaller plants to prevent them from producing an abundance of seed before the next scheduled working.

Two checkers post checked 1,997 acres scheduled for work during the season, and in addition a regular check was made on 2,536 acres. No advance checking was done and a good reserve still exists.



The two camps in Yosemite National Park used 4,475 man days to clear 550,501 ribes from 2,994 acres of which 272 acres were initial and 2,722 acres reeradication.

A sixty-six man camp should be established at Crane Flat in 1944 to do the much needed reeradication work on the cut-over lands in this area. A fifty-man camp is needed at Wawona to continue with the reeradication work both in the Mariposa Grove of Big Trees and in the vicinity of the camp itself. If a caterpillar tractor equipped with a drum and grapple is available initial work should continue on Trumbull Ridge in the dense populations of big ribes plants.

#### Sequoia National Park

A forty-five man blister rust camp was established at Red Fir and operated from June 12 to August 28. The ribes eradication work was done on areas adjacent to the ones that were worked last year and expanded west from Lodgepole and north from the Marble Fork of the Kaweah River. Except for an abundance of large Ribes nevadense plants along the streams and the precipitous slopes and rock bluffs along the river, this area presented no difficult eradication problems. Initial eradication in mature timber is usually easy and this area was no exception. However, it was necessary for each man to carry a cartridge belt filled with two-ounce packages of borax. This was applied to rock-bound crowns which could not be removed with pick mattocks.

The Red Fir blister rust camp spent the entire season on initial work removing 239,068 ribes plants from 2,224 acres through the use of 1,830 man days.

One checker performed all of the required regular checking covering 2,683 acres. No advance checking was done and still a reserve exists which is adequate for several ordinary seasons.

Ribes eradication next season should be continued on this area from either the Marble Fork or the Red Fir camp.

Results of the season's work and general summaries of all control work to date in the national parks are presented in Tables 1 to 4 which follow this text.

#### FINANCIAL STATEMENT

The National Park Service in Region 4 expended a total of \$89,276 for blister rust control and the expenditures were made as follows:

Yosemite National Park - - - -	\$ 47,489
Sequoia National Park- - - - -	17,275
Lassen National Park - - - - -	19,220
San Francisco Regional Office- -	5,292





TABLE 1  
SUMMARY OF RIBES REEDICATION BY THE NATIONAL PARK SERVICE IN 1953\*

National Park	Acres		Per Acre Worked			Omniship Status				Acres Ribes-free At Re-education
	Worked	Blocked Out	8-Hour Man Days	Ribes Eradicated	Total	Acres Covered		Private		
						Federal	Private	Federal	Private	
Initial Work										
Yosemite	272		272	1,374	216,431	5.05	805	272		216,431
Sequoia	2,224		2,224	1,830	239,068	0.82	107	2,224		239,068
Total	2,496		2,496	3,204	457,499	1.83	183	2,496		457,499
Reeducation										
Jassen Volcanic	1,975		1,975	1,080	99,218	0.55	50	1,950	15	98,160
Yosemite	2,722		2,722	3,101	331,270	1.14	122	2,722		331,270
Total	4,697		4,697	4,181	430,488	0.69	52	4,682	15	429,150
All Workings										
Jassen Volcanic	1,975		1,975	1,080	99,218	0.55	50	1,950	15	98,160
Yosemite	2,994		2,994	1,475	590,101	1.49	181	2,994		590,101
Sequoia	2,224		2,224	1,830	239,068	0.82	107	2,224		239,068
Total	7,193		7,193	4,385	868,387	1.03	134	7,178	15	867,649

\*This table also includes a summary of Ribes eradication on National Park land in 1943.

TABLE 2

SUMMARY OF RIBES REEDICATION BY THE NATIONAL PARK SERVICE 1933-1943

National Park	Acres		Per Acre Worked				Omniship Status				Acres Ribes-free At Re-education	
	Worked	Blocked Out	8-Hour Man Days	Ribes Eradicated	Total	Acres Covered		Private				
						Federal	Private	Federal	Private			
Initial Work												
Grater Lake	406	3,226	3,632	412	130,162	1.01	321	3,632		130,162		
Jassen Volcanic	5,122	8,168	13,290	5,270	119,338	0.92	155	13,170	140	5,235		
Yosemite	42,778	6,536	49,314	80,246	10,677,595	1.68	250	49,314		10,677,045		
Kings Canyon	3,261		5,132	535,010	1,58	256		5,132		535,010		
Sequoia	9,660		2,660	1,623	840	0.92	213	79,827	140	1,223,195		
Total	68,827	17,930	72,477	100,141	13,386,740	1.53	213	79,827	55	13,571,953		
Reeducation												
Grater Lake	350		350	81	13,450	0.23	38	350		13,450		795
Jassen Volcanic	1,172		1,080	59,218	0.55	50	1,080		6	59,218		
Yosemite	10,845		10,845	1,442	12,287	1.04	15	11,442		12,287		
Total	12,777		12,777	16,043	2,445,318	1.26	131	12,704	15	16,037		795
All Workings												
Grater Lake	756	3,226	3,982	493	143,592	0.95	159	3,982		143,592		
Jassen Volcanic	5,122	8,168	13,290	5,270	119,338	0.92	155	13,170	140	5,235		
Yosemite	53,900	6,536	60,436	95,128	13,007,215	1.75	265	59,168		13,007,215		3,927
Kings Canyon	3,261		5,132	535,010	1,58	256		5,132		535,010		
Sequoia	9,660		2,660	1,623	840	0.92	213	79,827	140	1,003,195		
Total	78,359	17,930	96,289	116,134	15,030,858	1.55	214	92,591	195	15,015,145		4,722

\*In addition, 8,206 acres, 5,277 man days, and 1,711,491 Ribes on lands worked by the Forest Service and the Bureau of Entomology & Plant Quarantine are now in the National Park.

\*\*In addition, 460 acres, 335 man days, and 238,567 Ribes on lands worked by the Bureau of Entomology & Plant Quarantine are now in Yosemite National Park.



TABLE 3

## SUMMARY OF REGULAR AND POST CHECKING ON THE NATIONAL PARK SERVICE PROJECT - 1943

OPERATION	Regular Check			Post Check			All Checks		
	Acres Covered By Final Check	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days
California									
Lassen Vol. N.P.	160	4.4	1 5/8	4,144	4.4	51 3/8	4,304	4.4	53
Yosemite Nat'l Park	2,536	4.7	47	1,997	3.6	34	4,533	4.2	81
Sequoia Nat'l Park	2,683	4.5	44 1/8	-	-	-	2,683	4.5	44 1/8
Kings Canyon N.P.*	-	-	-	2,807	2.6	24	2,807	2.6	24
Total	5,379	4.6	92 6/8	8,948	3.7	109 3/8	14,327	4.0	202 1/8

\* Checking financed by bureau.  
N.E.-No advance checking done.



TABLE 4  
(Omnibus Table 44)  
SUMMARY OF RIBES ERADICATION ON NATIONAL PARK LAND 1933-1943 (INCLUSIVE)

National Park	Acreage of White Pine in Net Control Area	Net Control Area		Initial Eradication Work		
		Total Acreage (W.P. & Prot. Zones)	Acreage Not Yet Worked Initially	Gross Acreage Initially Worked	Net Acreage Worked in Control Area	Gross Number Wild & Cultivated Ribes Destroyed
Crater Lake	3,782	3,782	150	3,632	3,632	130,162
Lassen Volcanic	17,792	17,792	4,042	13,750	13,750	700,361
Yosemite	120,620	120,620	63,100	57,520	57,520	12,389,396
Kings Canyon	22,430	22,430	19,189	3,241	3,241	836,010
Sequoia	82,678	82,678	72,798	9,880	9,880	1,229,485
Total - - -	247,302	247,302	159,279	79,817	88,023	15,285,414
						105,663

National Park	Reeradication Work							Totals									
	Gross Acreage Reported Reworked		Net Acreage Reworked in Control Area		Gross Number Wild & Cultivated Ribes Destroyed		Gross Number 8-Hour Man Days		Gross Initial Acreage and Reworked		Gross Number Wild & Cultivated Ribes Destroyed		Gross Number 8-Hour Man Days				
	First Rework	Other Reworkings	First Rework	Other Reworkings	First Rework	Other Reworkings	First Rework	Other Reworkings	Initial Rework	Other Reworkings	First Rework	Other Reworkings	First Rework	Other Reworkings			
Crater Lake	350	-	-	-	13,430	-	-	-	3,982	3,632	350	-	-	-	143,592	-	493
Lassen Volcanic	1,960	-	-	-	98,480	-	-	-	15,710	13,750	1,960	-	-	-	798,841	-	6,289
Yosemite	10,454	-	-	-	2,628,327	-	-	-	59,768	57,520	10,934	-	-	-	15,017,723	-	101,031
Kings Canyon	-	-	-	-	-	-	-	-	3,241	3,241	-	-	-	-	836,010	-	5,132
Sequoia	-	-	-	-	-	-	-	-	9,880	9,880	-	-	-	-	1,229,485	-	9,081
Total - - -	12,764	-	-	-	2,740,237	-	-	-	92,581	88,023	13,244	-	-	-	18,025,651	-	122,026



## BLISTER RUST CONTROL BY THE OREGON AND CALIFORNIA

## REVESTED LANDS ADMINISTRATION

Financial Project BLR-6

By

Douglas R. Miller, Forester, P-3

PURPOSE

The purpose of this project is to protect from white pine blister rust the white pine stands growing on the lands administered by the Oregon and California Revested Lands Administration of the United States Department of Interior. Since all O and C land is in Oregon, the project is confined to that State.

COOPERATIVE AGREEMENT

A cooperative agreement between the Oregon and California Revested Lands Administration and the Bureau of Entomology and Plant Quarantine was necessary since the Bureau is charged with the responsibility of leadership in the Federal program of blister rust control throughout the white-pine growing regions of the country. A Memorandum of Understanding between the two agencies has been in force since June 28, 1941.

ORGANIZATION AND LOCATION OF CONTROL WORK

The ribes eradication activities operated with O and C funds during the season of 1943 were under the supervision of the O and C technical supervisor, Mr. Ross A. Youngblood. The Bureau's operation supervisor furnished technical advice, and its checking supervisor was directly responsible for the checking work.

One camp was located on the West Galice, or Bunker Hill, unit of the Siskiyou National Forest to finish the initial treatment of that area. The other camp started initial work on the Fredenburg Springs portion of the Pinehurst unit near the Rogue River National Forest. During the latter part of the season some reconnaissance work was done on the Pinehurst area as well as on the Deadman Creek unit of the Umpqua National Forest.

WORK PERFORMED AND RESULTS ACCOMPLISHEDRibes Eradication

The destruction of ribes bushes on the West Galice unit was continued during the 1943 season by a 40-man crew located at Peavine. The camp was manned mostly with 16 and 17 year old youths during the first few days of June, and field work was started June 5. After ribes eradication work was completed on the Peavine area early in August, the crews removed the Ribes bracteosum



along those portions of Silver and Sourgrass Creeks outside, but flowing within a mile of, the control unit boundary. Work was terminated August 9 and the men were transferred to the camp on the Pinehurst unit.

The terrain of the country worked from the Peavine camp was rough and generally supported a dense cover of brush under the stand of sugar pine timber. Both these factors added to the difficulty of working. The ribes population was generally light and about three fourths of the area examined this year was found to be free of ribes, and hence was eliminated from crew work.

The crews at the Peavine camp removed 42,692 ribes bushes from 4,622 acres through the use of 1,104 man days. Over 6,000 bushes of Ribes bracteosum, the most rust-hazardous species, were removed from the streams just outside the control unit boundary. Several infected sugar pines were located in and around the camp and on the slope just north of the Peavine Lookout. The diseased trees were removed at the time of their discovery.

The O and C camp located on the South Fork of Beaver Creek in the Pinehurst unit started field work June 15 and continued until August 23. The terrain here is comparatively gentle. A sporadic brush cover underneath the timber increased the difficulty of getting men over some parts of the area. Brush was exceedingly dense in the burned-over area in the vicinity of Little Chinquapin Mountain. Ribes concentrations were of medium to light density on the worked area except in the recent burn where hundreds of ribes per acre were growing in the dense brush. About one third of the area examined during 1943 was eliminated from crew work because it supported no ribes.

The 30-man field crew, composed of youths of high-school age, removed 84,261 ribes from 1,475 acres through the use of 1,152 man days. A few infected sugar pines and many infected ribes were found along both Corral and Beaver Creeks within the control unit boundary. The diseased sugar pines and many of the diseased bushes were removed before the season ended.

When work had been terminated in the other camps a foreman was transferred from the Pinehurst job to do further ribes eradication at the McKinley Nursery with men obtained from a Civilian Public Service project. The R. bracteosum was removed from the East Creek and Middle Creek drainages, and some work was done along the western side of the control unit. There were 2,585 ribes removed from 70 acres through the use of 51 man days. Although the control unit still needs more work, the white pines are much safer from blister rust infection since the R. bracteosum has been destroyed.

#### Sugar Pine Reconnaissance

A reconnaissance party, financed and supervised by the O and C Administration, took sample ribes and sugar pine data on 15,640 acres during the late summer and early fall of 1943. The crew was trained at the Pinehurst Camp and 1,480 acres were covered in the Pinehurst-Little Butte Creek area. The party was then moved to the Deadman Creek unit on the Umpqua National Forest. Although 14,160 acres were sampled by the reconnaissance crew from this location the area was only partially covered.

The Deadman Creek unit lies north of the South Fork of the Umpqua River and is drained on the west by the three forks of Deadman Creek and on the east by Dumont and Straight Creeks. The lower portion of this unit has had the

timber removed during the last few years, yet few if any new ribes bushes are showing up since the disturbance. The area as a whole has very few ribes. Even the streams in some sections had few if any bushes growing along their banks.

### Checking

The organization and methods used in checking areas were the same as those employed during previous years. Since it was impossible to secure enough experienced checkers or even men in the older age groups, a few 16 and 17-year old youths were tried out. As a rule the younger men were not satisfactory. All sections covered by ribes eradication crews received an advance check before eradication work was started. An average of four to five checkers were used on the O and C operation and even then much of the area did not receive a final check. With the ordinary class of checkers this number would have been ample to take care of all checking needs.

Tables 1 to 4 present the results of this and past seasons' work in detailed form. These tables cover ribes eradication, ownership status, and checking.

### FUNDS EXPENDED

The O and C Administration expenditures from regular funds for ribes eradication, checking, and reconnaissance work during the calendar year of 1943 were \$36,112.88. In addition, Civilian Public Service labor valued at \$1.50 per effective man day amounted to \$76.50.

### RECOMMENDATIONS FOR FUTURE WORK

It is recommended that all O and C lands within the control units be examined each year to see if there is a sudden build-up of the rust on either ribes or sugar pines at any spot. All located infected pines should be removed and as many of the infected ribes as possible should be destroyed in order to keep the rust as nearly under control as possible until all the sugar pine stands have been protected. The practice of working areas supporting numerous ribes and areas appearing most subject to blister rust damage should be followed. If a sudden outbreak of the rust occurs at any future date then that spot should be given first priority of work.

The Swede Basin area should be thoroughly examined, particularly that portion where sugar pine seedlings were transplanted during the fall of 1943, to see that the ribes bushes do not become reestablished to such an extent that the sugar pines become endangered.

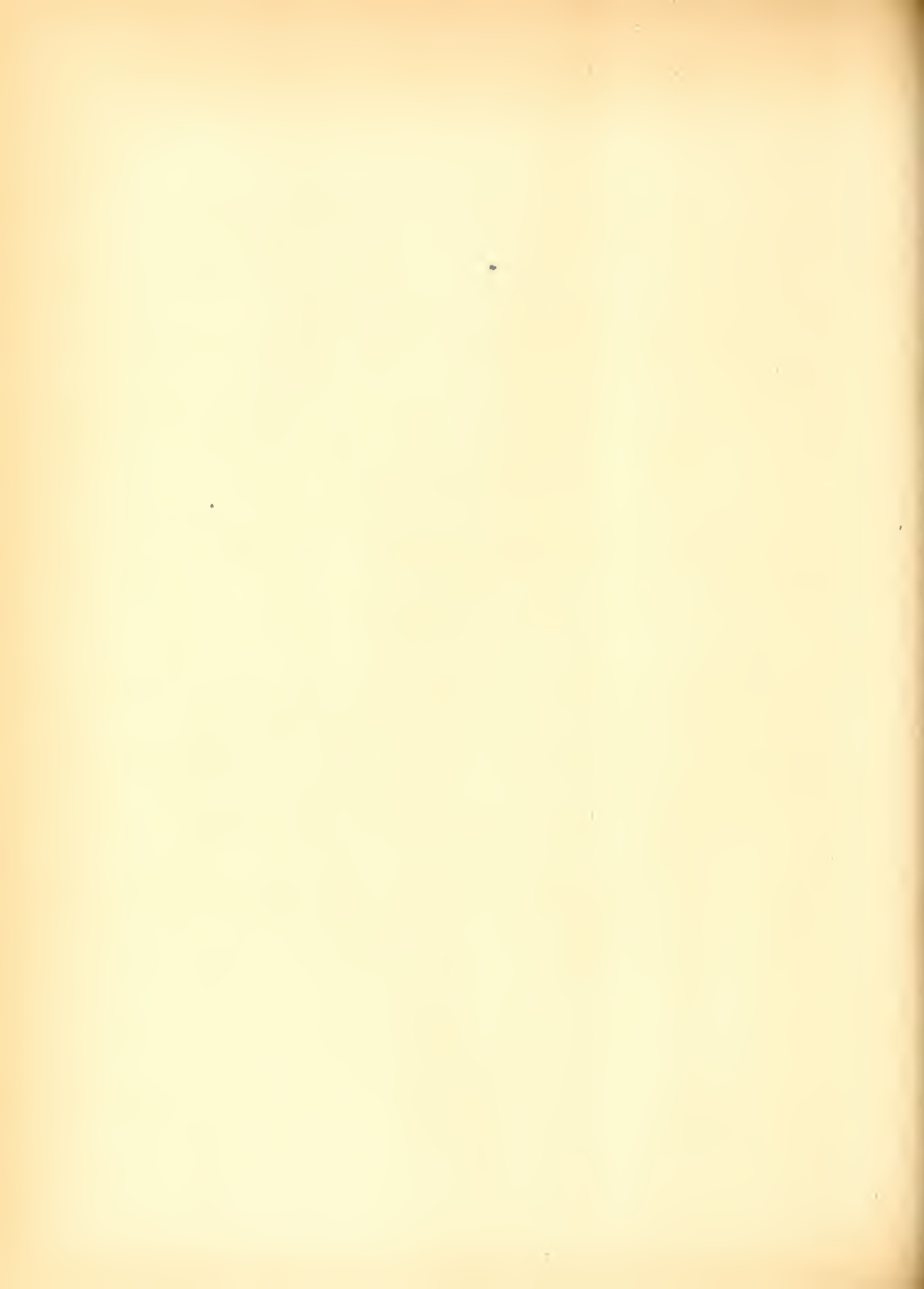


TABLE 1

SUMMARY OF RIBES ERADICATION BY THE OREGON & CALIFORNIA REVESTED LANDS ADMINISTRATION IN 1943

[illegible]

TABLE 2

# SUMMARY OF RIBES ERADICATION BY THE OREGON & CALIFORNIA REVESTED LANDS ADMINISTRATION 1940-1943

[illegible]



TABLE 3

## SUMMARY OF REGULAR AND ADVANCE CHECKING ON THE O &amp; C PROJECT - 1943

Operation	Regular Check			Advance Check			All Checks		
	Acres Covered By Final Check	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days
Rogue River	704	5.1	12 7/8	2,875	4.1	47 1/8	3,579	4.3	60
Siskiyou	135	5.0	4	7,829	5.4	171 2/8	7,964	5.4	175 2/8
Total	839	5.0	16 7/8	10,704	5.0	218 3/8	11,543	5.0	235 2/8

N.B. - No post checking done.





TABLE 4  
(Omnibus Table 3)

SUMMARY OF RIBES ERADICATION ON O & C LAND IN 1943

Control Operation	Initial Work			Reeradication Work			Totals		
	Acreage Worked	Number Ribes Destroyed	Number g-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number g-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number g-Hour Man Days
Rogue River	690	47,700	676	-	-	-	690	47,700	676
Siskiyou	3,312	37,262	678	-	-	-	3,312	37,262	678
McKinley Nursery	70	2,585	51	-	-	-	70	2,585	51
Total - - - -	4,072	87,547	1,405	-	-	-	4,072	87,547	1,405

TABLE 5  
(Omnibus Table 4A)

SUMMARY OF RIBES ERADICATION ON O & C LAND 1925-1943 (INCLUSIVE)

Control Operation	Acreage of White Pine in Net Control Area	Net Control Area		Acreage Not Yet Worked Initially	Initial Eradication Work*		Gross Number g-Hour Man Days
		Total Acreage (W.P. & Prot. Zones)	Acreage Reported Initially Worked		Net Acreage Worked in Control Area	Gross Number Wild & Cultivated Ribes Destroyed	
Rogue River					6,084	244,071	1,830
Siskiyou					31,402	441,184	7,616
McKinley Nursery					110	5,462	162
Total - - - -	129,709	129,709	92,113		37,596	690,717	9,608

\*No reeradication work has been done.



## SCOUTING AND DISEASE SURVEY

By

Douglas R. Miller, Forester, P-3

Scouting for white pine blister rust, *Cronartium ribicola*, in Oregon and California was continued during the 1943 season. The aim of the program was the same as that of 1942, namely: first, to ascertain whether or not a long-distance spread of the rust had occurred from aeciospores produced in the north; secondly, to determine the amount of intensification of the rust in those areas previously infected; and thirdly, to retard the development of the rust as much as possible by eliminating all cankers located as well as by recommending that certain local areas, which present conditions highly favorable to the incidence and development of the rust, receive ribes eradication immediately.

The status of the known spread of blister rust at the beginning of the 1943 scouting season in the Sugar Pine Region was as follows:

Oregon

Blister rust was discovered in Oregon in 1925 and since then has spread southward until by the end of 1942, infection centers had been found throughout the western white and sugar pine stands of both the Coast and Cascade Ranges. The disease is not uncommon in southern Oregon at those locations which were particularly favorable to its incidence and development.

California

Blister rust was discovered in California in 1936. At that time, the disease was confined to a narrow belt lying just south of the Oregon line on the Klamath National Forest. Weather conditions during the springs of 1937 and 1938 were favorable to aeciospore dissemination as well as to ribes infection, and, as a result, the rust made a long-distance spread into both the Coast Range and the Sierras. By the end of the 1942 season, many cankers on sugar pine had been found on the southern end of the Plumas National Forest a distance of about 165 miles south of the Oregon line. Infected ribes along the coast had been found 210 miles south of the Oregon line.

Table 1 presents the yearly known southward spread of the rust, measured from the Oregon line, and the generic host involved for each of the two sugar pine areas in California.

TABLE 1  
KNOWN SOUTHWARD PROGRESS OF BLISTER RUST IN CALIFORNIA

Area	Infected Host	Southward Spread in Miles by Years							
		1936	1937	1938	1939	1940	1941	1942	1943
Sierra Nevada	Sugar Pine	-	-	-	-	107	165	165	165
	Ribes	-	120	160	160	160	160	160	175
Coast Range	Sugar Pine	4	4	4	14	42	42	42	115
	Ribes	6	125	125	125	125	200	210	265

## ORGANIZATION AND METHODS OF WORK

The scouting organization, during the active ribes eradication season, consisted of a small crew working part time on the Rogue River National Forest. In late August and early September, members of the Bureau's permanent personnel as well as a few seasonal employees were organized into four scouting parties. These varied in size from two to eight men and the last crew discontinued field work about November 1. In addition, members of the Division of Forest Pathology and of the blister rust personnel of all agencies on the various operations both in Oregon and California made observations while performing their regular duties.

The methods used in scouting and the mechanics of performing the work and of recording the data were the same as those described in the 1942 Annual Report. Much stress is still being placed upon the location of areas where conditions favorable to the incidence and development of the rust are present. When a spot was located which had (1) a suitably sized opening in both the timber and brush canopy, (2) the proper exposure; (3) surface moisture present, (4) numerous ribes bushes and young sugar pine trees growing at the margins, and (5) located within the proper altitudinal range, much time was spent in examining the pines and ribes growing on it. The practice, adopted in 1942, of pruning all pines examined and of removing all cankers found was continued with satisfactory results.

## WORK PERFORMED AND RESULTS OBTAINED

The annual review of the charts of upper air currents and other meteorological records covering the Pacific Coast for the spring months of 1943 was made by Drs. W. W. Wagener and J. W. Kimmey of the Division of Forest Pathology. They state in part that: "... only two periods were noted in which wind characteristics for the Pacific Coast were such as to indicate possible spore carriage into the State. These were on April 9 and 10 and May 7, 8, and 9. In neither period could the winds be rated as highly favorable. .... Accordingly the possibility of rust establishment from long-distance northern spore sources in May is thought to be extremely slight."

With the exception of the two Coastal finds, extensive scouting revealed ribes infection only in the general vicinity of sporulating cankers. The infected ribes found on the ridge between Pardaloe and Billings Creeks in southern Mendocino County and those located on the Iverness-Point Reyes Road in Marin County showed every indication of the rust having overwintered on their leaves. Hence there was no definite evidence of the occurrence of a long-distance spread of the rust from aeciospores produced farther north.

## OREGON

### Scouting on the Umpqua National Forest

Scouting for white pine blister rust in the Big Camas country by C. R. King of the Forest Service and L. P. Winslow and D. R. Miller revealed the rust to be present in several places. Many infected ribes and an occasional canker on sugar and white pine trees were found along the road from Big Camas Ranger Station to Copeland Creek. One heavy infection center on sugar pine was located on the Fish Creek drainage. A few trees up to seven feet in height at the latter center had been killed and flags were numerous. Nearly every



small sugar pine tree less than two feet in height supported a trunk canker. The rust made its incidence in 1937, but cankers of 1941 origin were numerous. The heavily infected portion of this center covered only three or four acres and much of the infection was removed. The area is outside present control unit boundaries. There were 2,842 cankers removed from 56 trees.

A considerable amount of sugar and western white pines is found in the timber stands growing in this area. There is enough pine present to warrant the collection of more data, and it is quite likely a control unit could be established in the vicinity of Big Camas.

Another infection center of interest was located by Ross A. Youngblood of the O and C Administration and Miller at the end of the road leading into Deadman Creek. This center was of 1937 origin and involved at least 25 sugar pines at that time. No intensification has occurred. The nearest ribes observed were along Deadman Creek which flows 6 to 8 chains below the main part of the infection center. Rust was found on sugar pine at Sams Creek at the mouth of Quartz Creek and at three points along the Red Butte Road. Only one or two trees were infected at each of these areas.

The rust is beginning to amass through intensification at a few locations on the southern end of the Umpqua National Forest. The probable reason that heavy pine infection is not more prevalent is that there is generally a poor association of hosts. Ribes bushes are uncommon except along a few of the streams, and sugar and white pines at these sites are usually few in number.

The forest should be scouted thoroughly enough to see that the rust does not intensify to such an extent that the adjacent control units will be jeopardized. Of 800 pines examined, 87 were infected with 3,001 cankers and of the 517 ribes scrutinized, 112 were diseased.

#### Scouting on the Crater Lake National Park

The white and white bark pines around the rim of Crater Lake were examined to see if the rust had made its incidence; no rust, however, was found. The only rust located in the park was at the infection center on Annie Creek. Five more infected sugar and white pine trees with one canker each, of 1937 origin, were located. There were 37 infected ribes found along the stream at this center. Lyle N. Anderson and Miller examined 550 pines and 840 ribes inside the park boundary.

#### Scouting on the Rogue River National Forest

Scouting for the rust and canker elimination was started on the Rogue River National Forest early in May and was continued at irregular intervals throughout the summer. Although individual and small groups of cankers were found at numerous places, there were no new heavy infection centers located. During the latter part of July, a ribes eradication crew was trained to locate and remove cankers. They had worked about ten days in the Buck Basin area when fire and other interruptions forced the crew to disband. In addition to this crew, Winslow, Anderson, King, Miller, and George Reames (a checker), performed a considerable amount of scouting along with their other duties. Blister rust infection centers were examined at the following sites: Buck Creek, Foster Creek from its mouth to its headwaters, the ridge between Lost and Foster Creeks, the rock quarry and a grade fill on the Diamond Lake

Highway, Meadow Camp and section 15 along Flat Creek, Mount Stella, McCall Creek, Little Sunshine Creek, Buck Basin, East Fork of Elk Creek, Buzzard Mine, Union Creek Homesites, Natural Bridge, Mammoth Sugar Pine, Wall Creek, Ulrich Trail, Deen Creek, Mill Creek, Red Blanket Creek and COPCO flume, Fool and Bessie Creeks, Middle Fork of the Rogue River, Pinehurst and vicinity, Pinehurst camp area, Tub Springs and the rock quarry near Parker Mountain on the Ashland-Klamath Falls Highway.

The Tub Springs and rock quarry infection centers, both outside the control unit boundaries on the southern end of this forest, should have the ribes removed. Numerous cankers have been removed from the Tub Springs center during the past two seasons. The ribes are not numerous but there are enough Ribes sanguineum present to keep reinfecting the sugar pine. If the ribes were removed from an area of 20 to 30 acres, this center would be rendered practically harmless. The other center is at the rock quarry on the Ashland-Klamath Falls Highway in section 6, T40S, R6E. This quarry, about 10 to 12 acres in size, supports numerous ribes and young sugar pine and it lies within a large cut-over area. It appears to be an excellent location for a rapid intensification of the rust if it becomes established on sugar pine. A R. sanguineum bush was found infected at the quarry in 1943. It would take only 20 to 30 man days to nullify the potential danger of this spot.

Some damage to the sugar and white pines within the control units was being caused by the diseased R. bracteosum growing along the streams just outside the boundaries. To prevent further damage, the policy of the eradication of this species on a one-mile wide protection zone was inaugurated. Although there are numerous infection centers present within the control units on this forest, there has been little intensification of the rust on pines except at two or three places, and this intensification had occurred before the spots received their first protective treatment.

There were 5,189 sugar and white pines examined on this forest and 429 of these were infected with 2,772 cankers. The combination canker and ribes removal program appears to be keeping the rust well under control.

#### Scouting at the O and C McKinley Nursery

The sugar pine seedlings growing in the nursery as well as the ribes in the vicinity were examined by Youngblood, Winslow, and Miller. Since the R. bracteosum was removed during the fall of 1943, this area now has much greater protection from the rust. There is still some ribes eradication clean-up work needed before all possibilities of pine infection are removed. Although 3,000 pines and 210 ribes bushes (many of which were R. bracteosum) were carefully inspected, no rust was found.

#### Scouting on the Siskiyou National Forest

Several new infection centers were located on the Siskiyou National Forest by Anderson, Reames, Winslow, Youngblood, and Miller. Generally speaking, the host association is poor throughout this territory. There are, however, local areas which support both hosts in sufficient numbers to cause rapid intensification of the rust. Many of the streams support R. bracteosum, the most serious rust hazard of all wild ribes species, and, as a result, the disease has intensified rather heavily along a few of these streams. Examples of infection centers caused by R. bracteosum are those at Mt. Reuben, Nine Mile Lookout and Dutch Henry Trail.

A small infection center located on the ridge between Middle and Dads Creeks was of considerable interest. A few years ago a fire had occurred on the north side of the ridge and a heavy concentration of ribes have made their appearance since the area was burned over. The population consists mainly of Ribes cruentum but some R. lobbi and R. sanguineum are present. There were only 12 sugar pines in this vicinity and four of these were thrifty trees ranging in height from 8 to 15 feet and located at the margin of the burn in the midst of a ribes concentration. The rust made its incidence in 1937 and all the trees became infected at that time. During 1940 and 1941, the rust had intensified to such an extent on the four trees growing at the edge of the burn that all the lower limbs up to the last four whorls had died during 1943. The oldest three of the four living whorls were heavily infected and a few cankers on 1942 wood were appearing. The trees would have been killed within the next year or so, not from trunk cankers but from hundreds of twig cankers.

A center on Hays Hill depicting the value of timely ribes eradication work was discovered on a small tributary of Butcher Knife Creek which flows parallel to the Redwood Highway. All but two of the 175 cankers found on 48 trees were of 1937 origin. The ribes were removed from this area in 1939 just two years after the rust made its appearance. Even though two years had elapsed between the rust's incidence and control treatment, the ribes were removed before the cankers had time to sporulate. As a result of this timely ribes eradication work followed up by a canker removal program, the disease on this area is well in hand.

There were two other infection centers located in 1943 which showed rapid intensification of the rust on sugar pine. One center was just above Tiger Town on Althouse Creek and the other was on Sucker Creek between the mouths of Limestone and Bolan Creeks. There were many sugar pines growing along the streams at each of these two centers; and since ribes are generally common along the creeks, there was excellent host association.

The center located in 1942 on Bolan Lake Trail was examined and over 200 cankers of 1941 origin were removed. These young cankers were not visible when the center was discovered. The ribes were removed from this area in 1943, and, as a result of this dual treatment, the rust should be well under control for several years.

The Panther Mountain infection center, one of the oldest in southern Oregon, was examined by W. V. Benedict and Miller. Nearly all of the sugar pine, regardless of size or whether or not they were infected, were removed in 1936. Of the fifteen pines examined on the ridge only 6 were even near the original center and all of these were infected. The other 9 pines were too far from the center to contract the disease. The two infected trees nearest to the center were about 35 to 40 feet tall and fully half of each crown had been killed, not by trunk cankers, but by numerous limb cankers. There had been a heavy wave of canker intensification on these two trees during 1937, but no cankers of later origin were noted. The trees inspected were across the ridge top from the initial center hence were farther from the concentration of ribes bushes.

In addition to the centers already described, cankers were found on sugar pine at the following locations: Peavine Lookout, Peavine camp, Quartz Creek, Tunnel Creek road, sections 7 and 12 east of Kerby, Lower Sucker Creek,



section 23 in the Bolan Lake unit, Run Gulch, Number Eight Gulch, junction of Bolan Lake Road, Bolan Mt. Road and on the Siskiyou Summit. This latter center was actually in Del Norte County of California. Blister rust on ribes only was found at the Spaulding Mill-Site, Takilma-Happy Camp Road and Frog Pond Mine.

The two infected bushes located at the site of the old Spaulding mill would have little significance under ordinary conditions as this portion of the Swede Basin unit received protective treatment during 1940. However, since the Oregon and California Revested Lands Administration transplanted approximately 240,000 young sugar pine trees on this area during 1943 any infection is of major importance. Ribes bushes on this plantation are not numerous, but, should they become infected, there are enough present to cause considerable damage to the young sugar pines. It is imperative that this area receive another protective treatment during 1944, and it should have first priority of work of all other areas in Oregon.

All the centers found were thoroughly examined with the exception of the three on the northern end of the forest, namely Reuben Mountain, Dutch Henry Trail and Nine Mile Lookout. Lack of time prevented a complete coverage of these infection centers.

Efforts are being made to keep all known infection centers under control regardless of whether or not they occur within the boundaries of a control unit. Unless some ribes eradication work is done on the Reuben Mountain area within the next few years, the rust may get out of hand and start subjecting the control units to possible infection because of the large quantities of aeciospores that will be produced there.

Mature telia were found on the leaves of a Ribes sanguineum bush growing along Sucker Creek on June 19. This was a month earlier than telia were found in 1942.

Of the 4,107 sugar and white pines examined on this forest, 254 were infected with 3,066 cankers. There were 2,193 ribes bushes examined and 210 of these were found to be diseased.

#### CALIFORNIA

##### Scouting on the Klamath National Forest

More scouting for blister rust was done on the Klamath National Forest during 1943 than in any other year since 1937. As a result of this more intensive scouting program, many new infection centers were located. Nearly all of the scouting was performed by Anderson, Reames, Winslow, and Miller. Scouting began in early May and was continued intermittently until September 30 at which time two scouting parties spent their full time for the remainder of the season.

The host association is generally poor on the western portion of the forest. Like most of the sugar pine belt in southern Oregon, the ribes concentrations are along the streams while sugar pine is usually scarce at these sites. The eastern portion of the forest, particularly the Beaver Creek drainage, supports sugar pine along the streams as well as numerous ribes; and at the same time, ribes bushes are common in the timber growing on the hillsides.

There are several streams on the forest, mostly in the western half, which harbor Ribes bracteosum. These drainages are especially dangerous from the rust standpoint and should receive ribes eradication if at all possible so as to hold the rust in check until the control units can be fully protected. This is particularly true of the Thompson Creek, Indian Creek and the Tea Creek drainages. The R. bracteosum was removed from the Middle Creek and Doggett Creek drainages during the 1943 season.

The Hungry Creek portion of the Beaver Creek unit, which is receiving most of the ribes eradication efforts allotted to the forest and which has excellent host association, is probably the most heavily infected pine area within the control units of the Sugar Pine Region. The rust made its incidence in 1937 and heavy intensification on sugar pine occurred during 1941 at those locations where conditions were especially favorable to rust development. The sugar pine growing on those areas having been treated during or before 1941 support few cankers, but the pine on those spots in the untreated area where favorable rust developing conditions prevailed was quite heavily cankered. This area demonstrates the value and effectiveness of timely ribes eradication work.

Most of the Beaver Creek unit including all of that portion supporting heavily infected sugar pine has now had the ribes removed. Most of the area has, in addition, been covered by the canker elimination crews; hence, the rust should be pretty well checked. It will be necessary to keep a closer watch on this area than on most others since it is a favorable site for ribes growth and at the same time conditions are present which appear to be particularly favorable to rust development. There were 9,763 cankers removed from 685 trees growing in this territory.

Scouting revealed that the various species of ribes growing along Horse Creek and the R. bracteosum growing along Doggett Creek were heavily infected with blister rust. Since ribes eradication performed before or during the year of a heavy ribes infection had proven so effective elsewhere, these two drainages, as well as some of the others in the general area, had the ribes removed during the summer of 1943.

The infection center that was located along the Cedar Camp-Dillon Mt. Road in section 31, T12N, R5E illustrates how rapidly the rust can intensify when there is a synchronization of all factors necessary to rust development. The rust made its incidence in 1937 as there was one canker of that year's origin found. One thrifty sugar pine about 17 feet high was growing in the midst of a patch of R. sanguineum. These ribes bushes were about 3 chains from the sporulating canker. There were over 2,000 cankers of 1941 origin on this tree and as many as 75 incipients were counted on one limb. Another tree at a distance of 30 feet had 260 cankers and a third tree about 60 feet from the first had only 25 cankers. One other infected tree was located and it had the one canker of 1937 origin. Other sugar pine trees growing two to three chains away had no visible cankers. There was good association of hosts at other spots along the road in the general vicinity of this center, but all conditions necessary for infection were, apparently, not present or at least not present at the same time. It is because of this lack of uniform climatic conditions and other factors necessary for rust development that canker elimination coupled with the eradication of ribes from selected spots within a control unit give such a high degree of protection to the entire area. This same procedure should be used to keep the rust under control

outside the protective units until all areas within the control units have received their final treatment.

In addition to the areas already described, infected sugar pines were located at the following places: Siskiyou Summit, West Branch of Indian Creek, South Fork of Indian Creek, Clear Creek, Elk Creek, Ukonom Mountain, Ukonom Road, South Fork of Rock Creek, Dillon Mountain Road, Bark Shanty Gulch, Offield Mountain-Rogers Creek Road, Lumgreys Creek, Buckhorn Bally, South Fork of Cottonwood Creek, and North Russian Creek. Blister rust on ribes only was found at Dutch Creek and Kuntz Creek. Areas examined but at which no rust was found are: the trail from Dry Lake to Cinnabar Springs, Scotts Bar Mountain, Canyon Creek up to Marble Mountain and Etna and Mill Creeks.

There were 7,197 sugar pines examined on the Klamath National Forest and of this number 905 were infected with 13,870 cankers. Of the 4,319 ribes bushes inspected, 429 were found to harbor the disease. More cankers were found and destroyed on this forest than were found on all the other forests in the Sugar Pine Region.

The large sugar pine infection center on the East Fork of Indian Creek, from which 10,596 cankers were removed during 1942, was not examined this season. The pines and ribes on this area should be thoroughly examined in 1944. The R. bracteosum directly responsible for the rapid intensification of the rust on the sugar pine trees should be removed to keep the disease from assuming epidemic proportions within this drainage.

An interesting sidelight on the behavior of the rust on sugar pine was noted during the spring of 1943. On October 6, 1942 a 1940-origin trunk canker about 18 inches long, which had produced pycnia but not aecia, was found on a thriftily growing sugar pine in the Monty Creek drainage. This canker was so well developed that a two-foot section of the 3-inch sugar pine stem bearing it was removed and taken to the Beaver Creek camp for exhibitional purposes. The camp closed October 18 because of inclement weather and the canker was left lying on the ground which remained moist throughout the winter. The canker was examined on April 30, 1943 and two poorly developed aecia were found to be emerging. Numerous cankers treated in the same way but from slower growing trees were then examined. No aecia were found on them.

#### Scouting on the Trinity National Forest

The scouting performed by Winslow and Miller on the Trinity National Forest consisted almost entirely of a reexamination of those areas on which rusted bushes had been located in 1937. One infection center involving sugar pine was located on the headwaters of the Hayfork River in section 34, T29N, R11E. Intensification of the rust on sugar pine had occurred since it first became established in 1937. Seven trees had 73 cankers all but 10 of which were of 1940 or 1941 origin. This center was at the mouth of a small stream joining Hayfork River from the west. There were several sugar pines at this particular spot but pines were scarce just above and below the center. Only two R. sanguineum bushes growing within a few feet of the sporulating cankers were found to be infected. Ribes bushes were quite common throughout the portion of the stream scouted thus indicating that conditions during the 1943 aeciospore dissemination had not been particularly favorable to ribes infection.



This find extended the known range of sugar pine infection in the Coast Range from 42 miles to 115 miles south of the Oregon line.

Some of the Ribes bracteosum supporting drainages on the east slope of South Fork Mountain were examined. The streams are in fairly deep canyons and are rather well sheltered by mature timber as well as by a dense brush canopy. This heavy screening makes it difficult for ribes-infecting spores to reach their host. Sugar pine though not common occurs often enough to insure a considerable amount of pine infection should the R. bracteosum become infected. This species should be removed from the control unit as soon as possible.

Other areas examined but with negative results are: Donaldson Creek, Stuart Fork of the Trinity River, Happy Camp Creek, trail from Stuart Gap to Black Rock.

Blister rust host association is generally poor on the Trinity National Forest. Ribes are scarce except along some of the streams and at the higher elevations. Sugar pines are usually infrequent along the streams, but as noted elsewhere local areas are found where both hosts occur in sufficient numbers to be dangerous from the rust standpoint. This forest appears to be much drier than the Klamath National Forest and conditions generally seem less favorable to blister rust incidence and development. There are fewer places where conditions necessary to rust growth are present over any length of time. Because of this lack of conditions favorable to rust development, the policy of canker elimination and ribes eradication on selected areas will give an unusually high degree of protection to the sugar pine on this forest if and when the rust begins to make a sweeping inroad at these favorable rust-spots.

There were 841 white pines examined with only 7 showing cankers. The 73 cankers located on the 7 sugar pines were destroyed. Of the 1,821 ribes bushes examined only 2 were diseased.

#### Scouting on the Mendocino National Forest

Some scouting for blister rust was done on the Mendocino National Forest by T. H. Harris and R. Sovulewski. The following areas were examined with only negative results: Cold Springs and Fish Creeks in the Ball Rock area; Low Gap and Dead Mule Springs in the Anthony Peak area; Log Springs Creek, Kill Dry, Panther and Cold Creeks in the Plaskett Guard Station area; Wescott, Spanish and Salt Creeks in the Summit Springs Hill area; and Anderson Creek and Brushy Camp Ridge in the vicinity of Sheetiron Lookout.

Sugar pine and ribes association are generally poor throughout the forest. Ribes are scarce at most places and are abundant only at or above the upper limits of the sugar pine belt. The country as a whole appears to be drier and less favorable for rust development than the Trinity National Forest. However, there are local areas where good host association is present and where conditions appear to be favorable to rust incidence. These spots should be examined every year or so to see that the rust does not become too well established before it is detected and control measures applied.

No blister rust was found even though 465 sugar pines and 3,449 ribes were examined.

### Scouting on the Shasta National Forest

A few sugar pines and ribes were examined in the vicinity of Border and Round Mountains on the eastern side of the Shasta National Forest by Benedict, Winslow, and Miller. Scouting sites on the whole were unfavorable due to the scarcity of ribes.

The Damnation and Clear Creeks infection center on the western portion of the forest was hastily inspected while Winslow and Miller were en route to the Trinity National Forest. Four infected trees with 10 cankers of 1937 origin were located. Since no incipient cankers were found, it can be assumed that the rust is not intensifying too rapidly. An occasional ribes was found to be infected but lightly so.

The timber on this area was logged several years ago. There is a nice stand of fast growing sugar pine reproduction now present on these cut-over lands. Since the rust is present, these drainages should receive some protective treatment within a short time or the rust may flare up again as it did in 1937.

### Scouting on the Modoc National Forest

During the latter part of September, Benedict, Winslow, and Miller made an examination of the white pines and ribes on both the eastern and western divisions of the Modoc National Forest. The western portion generally afforded poor scouting conditions due to the scarcity of ribes bushes in association with sugar pine and to the dryness of the region. Scouting conditions in the Warner Mountains, comprising the eastern portion of the forest, were very good at places. Western white pine in scattered belts was found at the higher elevations throughout this range of mountains. Some of the more susceptible species of ribes were also found at these higher elevations but not always in association with the white pine. Ribes inerme was abundant in the pine stand around Lost Lake and one clump of R. petiolare was also found there. Both species were common along Silver Creek for the first two miles below the lake and there were a few western white pine trees present for the first mile. This is an excellent site to watch for the incidence and development of blister rust and should be examined annually.

The areas scouted for rust are: Pine Creek and Lilly Lake, South Fork of Davis Creek, Benton Meadows, Happy Camp Lookout and Grouse Springs, Parsnip Creek, Blue Lake, Mosquito Creek, East Creek, Lost Lake and Silver Creek. There was no blister rust found on the 210 western white and sugar pines nor on the 1,183 ribes bushes examined.

### Scouting on the Lassen Volcanic National Park

There was some scouting performed in the northern portion of the park by members of the ribes eradication personnel during the summer. Benton Howard and his scouting party spent the first day of October on the southern portion of the park where no observations had been made by the other crews. This trip was motivated by the finding of pinyon rust during 1936 on a ribes bush growing beside Kings Creek. They discovered 10 rusted bushes of R. roezli along Kings Creek. Five of the ten bushes infected with blister rust in 1943 were within 3 chains of the bush which had been infected with pinyon rust in 1936. This decade of diseased bushes was scattered over a distance of about ten chains. The ribes-infecting spores had not, from all appearances, been

produced in the vicinity; but probably came from one of the rust centers on the Lassen National Forest. Although ribes were numerous along the stream only an occasional sugar and western white pine could be found.

There were 37 western white and sugar pines and 555 ribes examined by Howard and his scouting party. No record was kept of the number of either host examined by the ribes eradication crews.

#### Scouting on the Lassen National Forest

There was a considerable amount of scouting performed on the Lassen National Forest not only by members of the organized scouting crews but also by the ribes eradication camp personnel. Howard, Winslow, and Miller made a cursory examination of the infection centers. This was followed by a more intensive inspection performed by Howard, E. R. Ellis, and their scouting crew. They were later joined by J. N. Mitchell and W. S. Burrill.

Three new infection centers involving sugar pine and four centers of diseased ribes only were located on this forest during 1943. The sugar pine center at the Hatchet Creek Bridge on the northern end of the forest was in the general vicinity of other known infection centers. There were only seven trees infected, but these had 337 cankers. About two thirds of the cankers were of 1941 origin showing that a goodly amount of intensification of the rust on sugar pine had occurred since the initial infection of 1938.

The other two pine centers were located on the southern end of the forest near Sterling City. An infected tree with three cankers was found at North Valley Creek. It was through the finding of numerous rusted ribes that this pine was spotted. The infected tree at Rag Dump Meadow was discovered in the same manner. Infected ribes had been found in and around the meadow throughout the summer and finally two cankers on a sugar pine were located. They were about 20 feet from the ground in a thickly foliated, open-grown tree. The cankers at these two centers were of 1938 origin.

The four centers having only ribes infected were located at Kenyon Lake, Wilson Lake, Upper Deer Creek, and Cottonwood Creek near Humbug Valley. Roughly speaking, these sites are between the sugar pine infection centers situated on the northern and southern ends of the forest. The ribes-infecting spores probably came from one or the other of these sugar pine infection centers.

Intensification of the rust on sugar pine occurred at the Buckhorn Lodge infection center. Cankorous trees at this site were located in 1942, but all the infection found at that time was of 1938 origin. When the center was examined this season, 32 trees infected with 140 cankers were located. All but two of the cankers were of 1941 origin and were not visible at the time of the 1942 inspection. Nearly all of these diseased trees had been examined and pruned in 1942 so numerous cankers were probably eliminated at that time. This center is situated near a small stream at the edge of a burn where sugar pine reproduction and ribes bushes are common. It should be closely watched for the next few years. Some of the ribes bushes were removed in 1943, and all would have been had not fire suppression activities interrupted the ribes eradication work.

The Bailey Creek area at Viola is an excellent example of the protection that a timely ribes eradication and canker elimination program will give to an area.



Most of the cankers were removed in 1941 before any of them had produced aeciospores. A few more were found in 1942 while the ribes were being removed. Five cankers on four trees were found in 1943. Only cankers of 1938 origin have been located indicating that no intensification of the rust on sugar pine has occurred since the initial infection. Since the entire territory has received selected area treatment and this infection center has received complete coverage, the rust appears to be thoroughly under control for the next few years.

One tree with 8 cankers of 1941 origin was found at the Little Hatchet Creek center and five sugar pines with one canker each of 1938 origin were located at the Goat Creek center. Both of these areas received some ribes eradication work during 1943. One canker was found on a sugar pine just below Indian Springs while four trees with one canker each were found along the South Fork of Montgomery Creek. These cankers were of 1938 origin which indicates that very little intensification of the rust on sugar pine has occurred since the initial pine infection of 1938. The ribes should be removed from this latter center as soon as possible to prevent the rust from flaring up when conditions necessary for rust development again become synchronized.

An inspection of the sugar pine and ribes at the following sites showed no blister rust present: North Fork of Little Cow Creek, Green Burney Creek, Silver Lake, Arthur Lake, Mill Creek a tributary to Little Cow Creek, Battle Creek, Battle Creek Meadows, McGowan Lake, North Antelope Creek, Howard Meadows, South Fork of Antelope Creek, Mill Creek Campsite, Mill Creek, Deer Creek, Upper Yellow Creek, Little Kimshew Creek and Big Kimshew Creek. The center at Clear Creek just north of Sterling City was examined, but no rust on either host was located.

Canker elimination and ribes eradication on selected areas is keeping the rust well under control on the Lassen National Forest. However, a complete coverage of all areas where the rust has been found should be made by ribes eradication crews as soon as possible, because the next good spread-year may intensify the rust to such an extent that control will be difficult as well as more expensive.

Of the 4,434 sugar pines examined on the Lassen National Forest, 56 supported 547 cankers. There were 8,635 ribes bushes inspected, and 238 of these were diseased.

#### Scouting on the Plumas National Forest

The same individuals and crews who scouted on the Lassen National Forest also performed scouting work on this forest. The infection centers discovered on the southern end of the forest during 1941 were examined to see whether the rust had intensified on sugar pine. A few cankers of 1941 origin and numerous infected ribes were found at these centers. Four additional centers were discovered along Lost Creek. An occasional canker of 1938 origin, which had sporulated during the last two or three seasons, was located at these various centers. Since sporulating cankers were present, and since all of the diseased ribes located in this general area were confined to the Lost Creek drainage, it was assumed that all ribes infection was due to spores produced locally and that no long-distance spread of the rust had occurred from spores produced farther north.



Ribes bushes were removed from many of the drainages in this district during the summer of 1943. This work should be completed during 1944. Since this is the southernmost known sugar pine center, it should be closely watched so as to keep aeciospore production to a minimum.

Another good example of the value of timely canker elimination and ribes eradication work occurs on the South Branch area. A sugar pine infection center was located there in 1941. Several cankers had sporulated that spring; and, as a result, there were numerous rusted bushes in the vicinity. The cankers were removed, and many of the diseased bushes were destroyed at the time of discovery. Later in the fall a crew removed the rest of the bushes from the stream type. When the area was examined this year, two more cankers of 1938 origin were found. Since one of these had produced numerous aeciospores during the spring, a few of the ribes bushes that had been missed during ribes eradication were infected. Again both the cankers and rusted ribes were removed. No cankers of 1941 origin were found even though many more spores were produced here in 1941 than were produced at the Lost Creek center. The difference was due to ribes eradication having been done at the South Branch center immediately upon discovery while the ribes were allowed to remain for one more year at Lost Creek. With a little attention from year to year, the South Branch infection center should give no more trouble.

The following areas were examined but no blister rust was found: Bucks Lake, Marble Creek, Little North Fork of the Feather River, French Creek Basin, and Haphazard Creek.

The results obtained so far through the use of canker elimination coupled with the eradication of ribes from selected areas on the Plumas National Forest indicate that the rust can be held pretty well in check for years of normal rust conditions. This procedure of rust control should be continued until all of the areas within control boundaries have received their final protective treatment,

Of the 2,132 sugar pines examined, only 17 were infected and these had 60 cankers. There were 218 diseased ribes bushes out of the 3,619 inspected.

#### Scouting on the Tahoe National Forest

The scouting on the Tahoe National Forest was done by Harris and Sovulewski during the latter half of September. The ribes and sugar pine were sampled on many areas throughout the length of the forest. Since blister rust had never been found on either host on this forest emphasis was placed upon ribes examination. There were twelve infected bushes located but only one was infected with blister rust. The other infections were pinyon rust (Cronartium occidentale). Although this infected bush was on the Tahoe National Forest, it was less than ten miles air-line from the sugar pine infection centers along Lost Creek on the Plumas National Forest, and the aeciospores were undoubtedly produced at that source.

The Ribes roezli bush infected with blister rust was growing on the south side of the Camptonville-Forest Road in section 28, T19N, R9E and was about 5 chains west of the junction of the road which traverses the Indian Creek area. While ribes bushes were common at this site, they were, however, restricted to the openings along each side of the road. Sugar pines occurred only

occasionally in this general area. The site is rather dry and many of the ribes were completely defoliated at the time of inspection.

The discovery of this infected ribes bush extends the known range of blister rust about 10 miles farther southward in the Sierra Nevadas. The Camptonville-Forest Road infection center is approximately 175 miles south of the Oregon line.

Pinyon rust was located at the following sites: Little Fiddle Creek, Oregon Creek, East Branch of Jim Crow Creek, Bloody Run Creek, East Fork of the North Fork of the American River, Middle Fork of the American River near McGuire, and near the Middle Fork of the American River on the Robertson Flat-French Meadows Road. These sites supported conditions favorable to the incidence of blister rust as well as to pinyon rust and should be carefully examined in the future.

Areas on which the sugar pine and ribes were scrutinized without finding any rust are: McMahon Mine Creek, St. Charles Ranch, Shower Branch, Cherokee Creek, Pipe Creek, Rock Creek, North Fork of Kanaka Creek, Jim Crow Creek, Poorman Valley, Cherry Hill, Devils Canyon, Poorman Creek, South Fork of Poorman Creek and Little Canyon Creek.

There were 620 sugar pine trees examined, but no cankers were found. Of the 4,744 ribes inspected, 12 were infected with a *Cronartium* but only one bush had *Cronartium ribicola*.

#### Scouting on Other Forests and Parks

There were many sugar pines and ribes scrutinized for the rust by Sovulewski and others on the Eldorado National Forest during 1943. Most of the examinations occurred on the north end of the forest in the vicinity of Pino Grande and Silver Creek. A few bushes were examined near Caldor on the southern end of the forest. Of the 377 ribes bushes inspected at the likely-looking spots, 53 were found to be infected with pinyon rust. No blister rust infection on either host was found on the forest.

Scouting by C. W. Fowler and others revealed that pinyon rust was even more abundant on the Stanislaus National Forest during 1943 than it was on the Eldorado National Forest. Of the 550 bushes examined in the vicinities of Skull Creek, Jawbone, and Hazel Green, 90 were infected with pinyon rust.

There were 154 ribes bushes found to be infected with pinyon rust on the Tahoe, Eldorado, and Stanislaus National Forests and all but two of the bushes were *Ribes roezli*. These two exceptions were on *R. nevadense*.

Some scouting on the Sierra National Forest and Yosemite and Sequoia National Parks performed by F. A. Patty and Mitchell failed to reveal either blister or pinyon rust.

#### Scouting in the Coastal Area

Infected ribes, the leaves of which bore only the uredial stage of the rust, were located at two places beside the Inverness-Point Reyes Road in Marin County by C. N. Partington and J. W. Kimmey on April 11, 1943. The uredial stage was well developed, and, from all indications, more than one generation

of the rust was present. Since the rust was so far along in its development so early in the season, there are strong probabilities that it had overwintered on the ribes leaves. One bush each of Ribes menziesi and R. divaricatum was found to be infected.

Partington again visited this area on August 22, 1943 and states in his letter of August 24, 1943 that, "At that time (April) a single bush with about half a dozen leaves was found infected there, and now it has spread to several bushes, with several hundred leaves. . . . the hosts here are all R. divaricatum". Speaking of the infected R. menziesi and its site Partington says: "Intensification was limited on this bush, the site was drier and the bush form was not a partial shade form like the R. divaricatum but rather a typical open form".

Telia were found on ribes leaves at both of these centers during the August examination, and the rust in each case was determined to be Cronartium ribicola. This find moves the known infection zone 55 miles farther south, and now places the rust, in the Coast Range, 265 miles south of the Oregon line.

An unidentified Cronartium on R. californicum was found beside the Yorkville-Anchor Bay Road during the 1942 season by Partington, Mitchell, and Harris. A thorough examination was made of the four centers found, and there were 20 infected bushes. When examined by Harris and Sovulewski in 1943, many of the same bushes were still infected. The four centers were not as intensively scouted in 1943 as they were in 1942, yet five more infected bushes were found. From all appearances, the rust had overwintered at all of these locations. This hypothesis is further borne out by the fact that no new rust centers were found in this area, and that there have been no indications in any part of the Sugar Pine Region of a long-distance spread of the rust from spores produced at northern sources. Only one leaf bearing telia was found, but this was enough to identify the rust as C. ribicola.

Table 2 is a summary of scouting results for the Sugar Pine Region for 1943. It presents for the various parks and forests within the region the number of each generic host examined and the number found to be infected with blister rust.

TABLE 2

## SCOUTING RESULTS FOR THE SUGAR PINE REGION-1943

National Forest or Area	Ribes		Sugar and Western White Pines Chankers				
	Examined	Infected	Examined	Infected	Stem	Limbs	Total
Oregon							
Umpqua	517	112	800	87	135	2,366	3,001
Oreter Lake N. P.	840	37	550	5	2	3	5
Rogue River	1,360	179	5,189	429	243	2,529	2,772
McKinley Nursery - O&C	210	-	3,000	-	-	-	-
Siskiyou	2,193	210	4,107	254	153	2,913	3,066
Total - - - - -	5,120	538	13,646	775	533	8,311	8,844
California							
Klamath	4,319	429	7,197	905	487	13,383	13,870
Trinity	1,821	2	841	7	6	67	73
Mendocino	3,449	-	465	-	-	-	-
Coastal Area	120	28	50	-	-	-	-
Shasta	139	8	205	4	1	10	11
Modoc	1,183	-	210	-	-	-	-
Lassen Volcanic N. P.	555	10	37	-	-	-	-
Lassen	8,635	238	4,434	56	51	496	547
Plumas	3,619	218	2,132	17	2	58	60
*Tahoe	4,744	12	620	-	-	-	-
*Eldorado	377	53	-	-	-	-	-
*Stanislaus	550	90	-	-	-	-	-
Total - - - - -	29,511	1,083	16,191	989	547	14,014	14,561
Sugar Pine Region							
Total - - - - -	34,631	1,626	29,837	1,764	1,080	22,325	23,405

\*All rusted ribes on the Eldorado and Stanislaus and all but one bush on the Tahoe were infected with Cronatium occidentale.



### SUMMARY

Scouting during 1943 revealed several new blister rust infection centers. Also, additional observations on the rust's behavior were made. A resumé of the results of the scouting season follows:

1. There was no general long-distance spread of the rust in California from aeciospores produced at northern sources.
2. Moisture and temperature conditions conducive to aeciospore germination on ribes were generally present at those areas where other factors necessary for the development of the rust are particularly favorable. The lack of a sweeping invasion of the rust on ribes at these favorable sites was due to poor or no general aeciospore dispersal.
3. This was a favorable season for the spread and development of pinyon rust on the southern end of the Tahoe and throughout the Eldorado and Stanislaus National Forests.
4. There was further evidence of blister rust having overwintered on the leaves of ribes bushes. This time the bushes involved were growing in southern Mendocino County and in Marin County.
5. Mature telia were found on a Ribes sanguineum leaf on June 19 which is about a month earlier than telia were found in 1942.
6. The blister rust infection zone in the Coast Range was extended about 55 miles farther south when the disease was discovered on ribes beside the Inverness-Point Reyes Road in Marin County. The zone on sugar pine was extended from 42 miles south to 115 miles south of the Oregon line.
7. The blister rust infection zone in the Sierra Nevadas was prolonged southward by about 10 miles when the fungus was found on ribes beside the Camptonville-Forest Road.
8. Blister rust was found for the first time on the Tahoe National Forest. One infected R. roezli bush was discovered in Section 28, T 19 N, R 9 E.
9. Blister rust on sugar pine was discovered for the first time on the Trinity National Forest when a center of 7 infected pines having 73 cankers was located at the headwaters of the Hayfork River.
10. Blister rust cankers at nearly all of the known or newly discovered infection centers were eliminated. A total of 23,405 cankers were removed from 1,764 pines.

## RECOMMENDATIONS

The following recommendations are being made after the scouting data have been compiled and analyzed:

1. That a scouting program of at least the same magnitude as that used in 1943 be continued.
2. That the following areas be covered by blister rust reconnaissance crews to determine the amount and extent of sugar or western white pine type that is present.
  - a. The area in the general vicinity of the Big Camas Ranger Station on the Umpqua National Forest.
  - b. The Mt. Reuben and Nine Mile Lookout area on the Siskiyou National Forest.
  - c. The sugar pine bearing lands on the Klamath National Forest; particularly the Indian Creek-Happy Camp, Clear Creek and Scott Bar Mountains areas.
  - d. The Damnation Mountain and Border Mountain areas on the Shasta National Forest.
3. That the following areas, where blister rust has been found on one or both hosts, receive some ribes eradication work as soon as possible.
  - a. Those areas within control unit boundaries.
    - (1) Swede Basin sugar pine plantation area on Siskiyou National Forest.
    - (2) The Hungry Creek drainage on the Klamath National Forest.
    - (3) The Lost Creek drainage on the Plumas National Forest.
    - (4) The Hatchet Creek drainage on the Lassen National Forest.
    - (5) The Sucker Creek drainage on the Siskiyou National Forest.
    - (6) The O and C nursery at McKinley, Oregon.
    - (7) The Mt. Reuben and Nine Mile Lookout area on the Siskiyou National Forest.
    - (8) The Deadman Creek area on the Umpqua National Forest.
  - b. Those areas outside control unit boundaries but which support a considerable amount of white pine.
    - (1) The Indian and Thompson Creek drainages on the Klamath National Forest.
    - (2) The area in the vicinity of the Big Camas Ranger Station on the Umpqua National Forest.

- (3) The Damnation Mountain-Clear Creek area on the Shasta National Forest.
- c. Those areas outside the control unit which harbor conditions especially favorable to the incidence and development of the rust and where the rust is rapidly intensifying or is expected to make rapid intensification. These areas range in size from 10 to 40 acres.
- (1) The rock quarry in the vicinity of Parker Mountain on the Ashland-Klamath Falls Highway.
- (2) The Tub Springs center in the vicinity of Lincoln on the Ashland-Klamath Falls Highway.
- (3) The South Fork of Montgomery Creek drainage on the Lassen National Forest.
- (4) The Tea Creek drainage on the Klamath National Forest.





ANNUAL REPORT - 1943

PROGRESS MADE IN

RIBES ECOLOGY AND DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION

BY THE

BERKELEY OFFICE

Work Project BLR-1-6



## PART VIII

### PROGRESS OF RIBES ECOLOGY WORK AND DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION IN THE SUGAR PINE REGION, 1943

By

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and H. R. Offord, Pathologist (P-4)

#### FOREWORD

Methods development work in the Sugar Pine Region during the field season of 1943 was restricted to checking of previously established Diesel oil and ammonium sulfamate plots and additional tests of aqueous ammonium sulfamate, to further exploration of chemical tests for the identification of the limits of blister rust cankers on pine, and to cooperative work with operations in demonstrating the practical use of Diesel oil and borax for ribes eradication. Mr. Winslow was assigned full time to operations work and to disease survey work in Oregon and northern California. Because his assignment was chiefly in Forest Service and State prison camps it was not feasible to undertake special methods studies which had been proposed in the spring of 1943.

In the 1942 annual report the various sub-projects in ribes ecology were summarized so as to provide a convenient reference to the background and progress made to date. Since one year is a non-significant time interval in ribes ecology studies no purpose would be served by again bringing these status reports up to date. In ecology work greater emphasis is now being placed on the correlation of data on ribes and sugar pine. For many of the practical applications of ribes ecology we need to have a correlated measure of the ecologic requirements of sugar pine and ribes. Insofar as possible, field practices in the control of blister rust disease should favor regeneration of sugar pine and suppress ribes populations. With this general objective in mind greenhouse and field tests were initiated this year on the germination of sugar pine seed and the planting of sugar pine seedlings.

#### SECTION 1. RIBES ECOLOGY IN THE SUGAR PINE TYPE

Status summaries of major ribes ecology sub-projects were given in the annual report for 1942. Serial Report No. 112 of the Berkeley Laboratory, "Manual for care of ribes ecology plots in the Sugar Pine Region," dated October 8, 1941, describes methods of collecting ecological data, and lists the studies and plots then making up the ribes ecology program.

Item 1 of this report, "Experimental germination and planting of sugar pine," is a new sub-project which is here described in annual report form for the first time.

##### 1. Experimental Germination and Planting of Sugar Pine.

The ecological characteristics of Sierra gooseberry and sugar pine are somewhat similar. In many respects abundance of gooseberry can be used as an indicator of quality of sugar pine sites. There are, however, important ecological differences between the two species. The gooseberry finds no difficulty in regenerating from seed on favorable sites; whereas sugar pine

has in a large measure failed to regenerate from seed on many sites from which excellent stands of mature sugar pine had been logged.

Sugar pine seed is traditionally hard to germinate satisfactorily. Nursery practice for sugar pine is said to be more difficult and exacting than for ponderosa pine. As a result the planting of sugar pine has been practically discontinued. No doubt many factors are involved in the lack of quantity and vigor of natural sugar pine regeneration. The present study should lead to a better understanding of the many ecological factors involved in the regeneration of sugar pine from seed. Further improvement of economic control measures should be facilitated by correlation of findings on the ecology of both pine and ribes.

Serial Report No. 120, "Experimental germination of ribes and pine seed, Series of 1943," dated October 23, 1943, presents in some detail the results of a number of germination tests on sugar pine seed. The following results of these 1943 tests are considered to be of particular interest.

(1) Excised embryos from dormant sugar pine seeds grew readily and immediately.

(2) Intact seeds extracted from fresh "green" unopened sugar pine cones would not grow immediately. In fact, such seeds were more difficult to germinate than were dry stored seeds.

(3) Stratification of sugar pine seeds without special prestratification treatment resulted in good percentages of germination, but germination in the greenhouse was slow, i.e., germination was scattered over several to many weeks.

(4) Sugar pine seeds which were alternately frozen and thawed and then stratified, gave immediate and excellent results in the greenhouse. In one series of tests, 5 out of 10 cultures gave perfect germination within 2 or 3 weeks after removal from stratification to the greenhouse.

The freeze-and-thaw treatment consisted in subjecting the seeds, planted as usual in wet sand, to alternating periods of 24 hours each at a freezing temperature, and at room temperature. One cycle of the freeze-and-thaw treatment consisted of a 24-hour period at freezing temperature and a 24-hour period at room temperature. One, 2, 4, and 8 cycles of freezing at 0° C. (32° F.), and 1 and 2 cycles at -3° C. (26.6° F.) were about equally efficacious in conditioning seeds for germination. A greater number of cycles of treatment at -3° C., and treatment at -18° C. (0° F.) were not advantageous.

A few seedlings resulting from the germination experiments described above were transplanted to forest soil in 2"x2"x4" tarred-paper planting pots, and later transplanted to open ground within the Cow Creek and Chowchilla Mt. enclosures. Pieces of board were placed so as to completely shade the transplants during the hottest parts of the day. The seedlings were watered at irregular intervals during the summer. All seedlings survived the summer.

Additional experiments on the germination of sugar pine seed and on the planting of current season sugar pine seedlings are contemplated for 1944.

## 2. Cow Creek 10-Acre Regeneration Plot.

See the 1942 annual report, pp. 112, 121, 126.

Both sets of 10 selected square-chain subplots (eradicated and uneradicated) of the Cow Creek 10-acre plot (CFES, MC#5) were inspected in 1943. The same total number of live ribes bushes (109) was found in 1943 as in 1942 on the 10 uneradicated subplots. The size distribution of these bushes, however, had changed due to an increase of live stem on many of the smaller bushes, and a decrease of the live stem on some of the larger bushes. The total live stem on the 10 subplots had decreased slightly. In comparison with 1942, an appreciably smaller number of fruits were found on the bushes this year. Bush vigor was lower than in 1942.

Ten small R. roezli bushes, 1 to 8 years old, were found in 1942 on the set of 10 selected and eradicated subplots. None of these plants could be found in 1943. The group of about 50 current season seedlings found in 1942 in subplot 6, on the site of a large bush removed in 1941, had shrunk to about 10 seedlings of 1942 origin and 5 of 1943 origin--all of very poor vigor. It is expected that none of these seedlings will survive for more than another year or two. Three other small gooseberries were found in 1943.

Pine reproduction on the 2 sets of subplots is reported in table 1.

The data from this plot are bearing out the prediction that the area is now past the vegetational stage at which seedling regeneration of R. roezli will be troublesome.

## 3. Occurrence of Current Season Seedlings.

See the 1942 report, pp. 113, 121, 127.

Table 2 presents the numbers of current season ribes seedlings found on this series of plots in 1943 and in 1942. A very marked reduction of seedling occurrence from 1942 to 1943 is apparent. All of this reduction is not attributable to elapsed time since eradication. The spring of 1943 was not particularly favorable to the field germination of ribes seeds. The factors concerned, other than years since last eradication, have not been isolated and analyzed. Some meteorological factor, or combination of factors, is indicated.

## 4. Seedling Survival and Growth on Worked Areas.

See the 1942 annual report, pp. 113, 122, 128.

Table 3 summarizes the data collected from this series of plots in 1943. In this table, as in table 2, it can be noted that 1943 was a poor year for the occurrence of ribes seedlings. Because of the few 1943 seedlings found on the Butt Creek plots, the ratios of seedling numbers do not have the same significance as those of the other plots. The numbers of CSS (current season seedlings) reported for the Cow Creek 1.6-acre plot are estimates and are perhaps low; the other CSS data are hand-tally counts. One-year survival of seedlings (last column of table 3) is seen to vary considerably within short distances, e.g., on plots A, B, C, and D, and averages are uncertain. In general, about  $1/4$  to  $1/3$  of CSS in 1942 survived as 1-year-olds to time of inspection in 1943.



## 5. Occurrence and Growth of Ribes on Burns

See the 1942 annual report, pp. 114, 122, 129, 130.

Table 5 of the 1942 annual report (p. 130) gives a cumulative summary of the growth of some 395 seedling-origin ribes bushes which appeared, mostly in 1937 and 1938, after a 1936 burn in a fully stocked mature sugar pine forest near Cow Creek Guard Station, Stanislaus N.F. Table 4 of this report adds to this summary by presenting the 1943 data from the same series of bushes. One error should be corrected in table 5 of the 1942 annual report. Series OE-QI (1940), a year of bush origin - 1937: total live stem should be changed from 110.5 feet to 52.6 feet, and average bush size should be changed from 3.3 feet to 1.5 feet of live stem.

The excellent survival, but very slow growth, of this series of gooseberry bushes is remarkable. Fruiting data for these plants are presented in section 8 of this report.

Table 5 (Cow Creek spot burn plot) adds to the story of one-crop slow-growth seedlings of E. roezli following burns in which mature pine trees are not killed. Results from plots established in 1941 on the (1939) Cutler Meadow burn, Plumas N.F., in which very nearly all vegetation was killed (see annual report 1941, p. 88) also show this same single crop of gooseberry seedlings, though in this case growth rate has been rapid. On one series of 20 milacres on the Cutler Meadow burn, 897 ribes of 1940 origin, and only 7 of 1941 origin have been removed to date; no 1942- or 1943-origin ribes have been found.

Data from Cutler Meadow and Cow Creek burn plots thus emphasize that ribes eradication work should follow a medium to heavy burn closely enough to prevent all fruit production by post-burn seedling ribes. On light burns and on areas logged but not burned, the total prevention of fruiting is perhaps not so imperative.

## 6. Regeneration of Ribes on One-Acre Plots.

See the 1942 annual report, pp. 114, 122-123, 131.

Table 6 presents ribes data collected in 1943 from this series of plots. These data further emphasize the extreme difficulty of finding and eradicating all of the ribes on any area. The rapid increase of the ribes population on the Shaver Timber plot following logging is discouraging, but not altogether unexpected. The post-logging appearance of an appreciable number of R. viscosissimum bushes on the Shaver Timber plot is worthy of note because no bushes of this species were observed on this plot in a careful pre-eradication inspection.

The pine reproduction data from these 8 one-acre plots are summarized in table 1. It is observed that sugar pine of the small sizes recorded in the table are considerably more numerous than are ponderosa pine, but that even the best stocked plots leave much to be desired. In the future it is proposed to take data for similar summary tables at intervals of 2 to 4 years.



## 7. Ribes Regeneration in Grazing Enclosures.

See the 1942 annual report, pp. 113, 123, 132.

Table 7 presents a summary of ribes growth data for the 4 sets of plots of this series. All 4 series are of the same size and organization. In each case the 4 subplots inside the fence (2 worked by hand, and 2 with oil) have an area of 1 sq. chain. The 4 subplots outside the fence have an equal area. In table 7 the data from the 8 subplots of each enclosure are pooled and considered as a total. The table offers detailed comparisons of ribes occurrence and growth on the 4 areas, but does not compare growth inside and outside of the enclosure fences.

Table 8 presents summarized pine reproduction data on the 4 enclosure plots.

Tables 9 and 10 present summarized ribes regeneration data on the Lake Almanor and the Big Bar Mt. enclosure plots. The abundant occurrence of R. roezli seedlings on the Lake Almanor plots, and their very slow growth is noteworthy. The gooseberry seedlings on the Big Bar Mt. plots are much fewer than those on the other plots, but much more vigorous in growth. The 4 subplots outside of the fence of the Big Bar Mt. enclosure were inadvertently worked by eradication crews early in the field season of 1943, and some ribes were removed. The writer inspected the plot later in the season and could not tell the number or size of the bushes which had been removed. No bushes were removed from within the fenced area.

The Big Bar Mt. enclosure plot offers the greatest contrast between the vegetation inside the fence and the contiguous vegetation outside the fence. In the fall of 1940 when the plot was established the area was well covered with short stiff "bumpy" clumps of heavily grazed deerbrush (Ceanothus integrifolius). Considerable other vegetation, notably a lot of Whitneya dealbata, a relatively rare pioneer composite, was also on the area. The area outside the fence remains in very nearly the same condition as in 1940. The deerbrush inside the fence, due to complete release from grazing pressure, is now 8 to 10 feet high. Other vegetation, especially perennial grass, is likewise much more abundant and luxuriant inside the fence. The whole ecological aspect of the fenced area has changed enormously. Because of the greatly increased plant growth inside the fence, and the consequent early and rapid seasonal depletion of soil moisture, it is expected that pioneer plants will soon begin to disappear from the fenced area.

## 8. Fruiting of Seedling-Origin Ribes.

See the 1942 annual report, pp. 114, 123, 133.

There were 136 fruiting gooseberry bushes removed on June 16, 1943, from the 24 milacres of plot G, Chowchilla Mt. An estimated total of 1,523 feet of live stem (av. 11.2 ft. per bush), and 2,115 green fruits (av. 15.6 fruits per bush), were removed with the 136 bushes.

A number of gooseberry plants fruited again this year on the burned portion of the Cow Creek 5.6-acre plot (CFES MGT-12). This year, as in 1941 and 1942, very few fruits were fully mature before they disappeared. Practically all gooseberry seeds were presumably consumed and destroyed by rodents. Table 11 summarizes the data collected from the fruiting bushes on this

Cow Creek plot during the last three seasons. How long the gooseberry crop of this area will continue to be destroyed, or very nearly destroyed, by rodents is a matter of conjecture. To the present time on this 1936 burn there has been little or no addition of gooseberry seed to the duff and soil.

#### 9. The Ribes Regeneration Meter.

See the 1942 annual report, pp. 123-125.

A small amount of time in 1943 was spent on the ribes regeneration meter. Tests that were made seemed to show that the addition of the list of indicator plants to the key was desirable.

As these studies progress two complex factors in particular appear to have important bearing on ribes regeneration. They are (A) the capacity as a water reservoir of the total soil mantle on an area, and (B) the maximum soil-surface temperature. Factor (A) is dependent primarily upon (1) the depth of the soil mantle, (2) the amount of rock in the soil, (3) the apparent specific gravity of the soil, (4) the amount of water held against gravity at saturation, and (5) the wilting percentage, that is, the amount of water remaining in the soil when plants can no longer extract water for their use. Factor (B) is dependent primarily upon (1) latitude, (2) altitude, (3) season of the year, (4) color of the soil, (5) moisture content of the soil, and (6) the amount and distribution of shade as conditioned by plant cover.

In any revision of the regeneration meter that may be made, heavier weightings should perhaps be given these two factors.

TABLE 1

## PINE REPRODUCTION ON ONE-ACRE RIBES ECOLOGY PLOTS, 1943

Plot	Year of Logging	Number of Small Pine Trees, by Height Classes as Shown														Ponderosa Pine				Totals			
		Sugar Pine							Ponderosa Pine							Totals				Totals			
		** 0- CSS 5.9"	6- 11.9"	1'- 1.9'	2- 3.9'	4- 6.9'	7- 10.9'	11- 20'	** 0- CSS 5.9"	6- 11.9"	1'- 1.9'	2- 3.9'	4- 6.9'	7- 10.9'	11- 20'	Totals				Totals			
Cow Creek 10-acre, eradicated*	1923	-	14	8	10	10	6	2	50	-	2	2	5	9	5	1	3	27					
Cow Creek 10-acre, uneradicated*	1923	-	4	1	6	11	-	2	24	-	-	3	5	7	5	1	4	25					
Shaver Timber	1941	-	3	2	7	20	23	19	12	86	-	1	-	2	1	-	4						
Blue Canyon	1920	-	4	5	4	4	12	22	26	77	-	-	1	1	-	3							
Pilot Peak	1910	2	1	13	7	40	53	33	11	160	-	-	10	15	21	28	6	86					
Signal Peak	1930	-	2	1	8	51	40	17	15	134	-	-	-	5	10	13	4	35					
Inter-Road	1936	-	-	9	31	45	73	77	46	281	-	-	1	2	6	13	8	35					
Gentle Gully	1925	2	3	11	18	17	18	7	76	-	1	1	-	1	1	2	-	6					
Rock Creek	None	1	8	16	3	11	3	2	1	45	-	-	-	1	1	-	2						
Fianinni Timber	1942	1	2	13	7	9	3	1	-	36	2	-	1	1	2	-	-	6					

\* = Eradicated and uneradicated set of 10 selected square-chain subplots.

\*\*CSS = Current season seedlings.

TABLE 2

## OCCURRENCE OF RIBES SEEDLINGS ON MILACRE PLOTS, 1942-1943

Milacre Plot Series and Location	Date of Check	Num- ber of Mil- acres	Number of Current Season Seedlings		Ratio (Per- cent) of 1943- to 1942-Origin Seedlings
			1942	1943	
1938, Chowchilla Mt., Sierra N.F.	7/6/6/13	10	1,035	309	30
1939, Do.	7/6/6/13	5	749	165	22
Plot E, Do.	7/9/6/17	12	499	252	51
Plot F, Do.	7/9/6/17	12	254	81	32
Markwood Meadow, Do.	7/10/8/10	10	18	3	17
Pine City Mt., Do.	6/12/6/19	6	610	334	55
Cow Creek Campsite, Stanislaus N.F.	6/19/6/11	10	1,592	229	14
Spanish Ranch Ridge, Plumas N.F.	8/2/7/28	10	39	6	15
Totals	-	75	4,796	1,379	-
Averages	7/6/6/28	-	639	172	29.5

TABLE 3

## ONE-YEAR SURVIVAL OF RIBES SEEDLINGS, 1942-1943

Area and Forest	Plot or Sub- plot	Date of Check		Mil- acres of Area	Current Season Seedlings Found		Ratio (Percent) of 1943- to 1942-Origin Seedlings	1942- Origin Seed- lings in 1943	Percent Surviv- al 1942 Seed- lings
		1942	1943		1942	1943			
Cow Creek, Stanislaus N.F.	A	6/18	6/22	30	341	50	15	61	18
	B	6/19	6/23	28	1,052	232	22	283	27
	C	6/20	Do.	21	279	104	37	18	6
	D	6/19	Do.	4-7/8	10	0	0	1	10
Chowchilla Mt., Sierra N.F.	E	7/9	6/17	12	499	252	51	29	6
	F	Do.	Do.	12	254	81	32	36	14
Cow Creek 1.6- acre seedling occurrence plot, Stanislaus N.F.	I	7/1	6/29	60	210	150	71	75	36
	II	Do.	Do.	210	1,085	270	25	305	28
	III	Do.	Do.	300	1,215	350	29	295	24
	IV	Do.	Do.	200	710	220	31	235	33
	V	Do.	Do.	200	250	110	44	100	40
	Tot.	Do.	Do.	970	3,470	1,100	32	1,010	29
Butt Creek Camp- site, Plumas N.F.	I	7/28	7/23	25	5	10	200	5	100
	II	7/29	Do.	24	1	16	1,600	0	0

TABLE 4

## RIBES BUSHES ON BURNED PORTION OF 5.6-ACRE COW CREEK PLOT, 1943

Bush Series	Year of Bush Origin	Number of Ribes Bushes by Live Stem Size Classes								Total Live Bushes	Total FLS*	Aver. Size Bush FLS*
		0'-4.9"	5"-11.9"	1'-2.9'	3'-5.9'	6'-11.9'	12'-24.9'	25'-39.9'	40'+ Plus			
AA-CV (1937)	1937	-	5	11	19	17	10	5	2	69	656	9.5
DA-IH (1938)	1937	3	16	29	24	10	6	2	-	90	401	4.5
JB-OD (1939)	1937	2	4	23	27	15	10	3	-	84	558	6.6
	1938	-	4	14	13	3	1	1	1	37	203	5.5
	1939	-	-	1	1	1	2	-	-	5	48	9.7
	Total	2	8	38	41	19	13	4	1	126	809	6.4
OE-QI (1940)	1937	1	13	14	2	1	2	-	-	33	66	2.0
	1938	-	2	8	2	-	-	-	-	12	32	2.7
	1939	-	-	3	3	1	-	-	-	7	27	3.8
	Total	1	15	25	7	2	2	-	-	52	125	2.4
QJ-RS (1941)	1937	8	10	4	3	-	-	-	-	25	27	1.1
	1938	1	4	2	1	-	-	-	-	8	11	1.4
	1939	-	-	1	-	-	-	-	-	1	2	2.1
	Total	9	14	7	4	-	-	-	-	34	40	1.2
RT-SP (1942)	1937	5	-	1	-	-	-	-	-	6	3	0.4
	1938	7	3	1	-	-	-	-	-	11	4	0.4
	1939	2	1	1	-	-	-	-	-	4	3	0.7
	Total	14	4	3	-	-	-	-	-	21	9	0.4
SQ-TO (1943)	1937	4	3	4	1	-	-	-	-	12	14	1.1
	1938	7	1	2	-	-	-	-	-	10	4	0.4
	1939	2	1	-	-	-	-	-	-	3	1	0.4
	Total	13	5	6	1	-	-	-	-	25	19	0.8
AA-TO To-tals	1937	23	51	86	76	43	28	10	2	319	1,724	5.4
	1938	15	14	27	16	3	1	1	1	78	254	3.3
	1939	4	2	6	4	2	2	-	-	20	81	4.1
Grand Totals		42	67	119	96	48	31	11	3	417	2,059	4.9

\*FLS = Feet of live stem.



TABLE 5

## SURVIVAL AND GROWTH OF RIBES ROEZLI SEEDLINGS ON COW CREEK 1937 SPOT-BURN PLOT

Date of Check	Bush Series	Number of Bushes	Total Dead Alive	Ribes Bushes by**			Total Feet	Aver. Size of Bush	Years of Origin of Live Bushes			
				Size Classes	12-36"	36-48"			1936	1939	1940	1941
6/20/39	AA-CP	68	-	68	31	5	1	21	15	35	6.2	-
8/2/39	AA-CP	68	4	64	40	22	1	17	11	28	5.2	-
6/2/39	AA-EL	116	7	109	32	61	15	1	37	36	73	8.0
9/2/39	AA-EL	116	11	105	41	51	12	1	31	29	61	6.9
6/2/39	AA-EX	128	17	111	25	63	20	3	31	40	71	7.7
6/2/39	AA-FI	139	25	114	19	47	42	6	36	84	119	12.6
6/26/42	AA-FP	146	29	117	22	48	41	6	37	116	143	14.7
									107	7	2	-
												1

\*CSS = Current season stem, OLS = Older live stem, and TLS = Total live stem.  
 \*\*ILS = Inches of live stem.

TABLE 6

## RIBES OCCURRENCE AND GROWTH ON ERADICATED AREAS: SUMMARY OF DATA FROM ONE-ACRE PLOTS, 1943

Forest	Plot	Date of Check, 1943	Year of Last Ribes Erod.	Estimated Feet of Live Stem* CSS IOLS TLS	Size Distribution of Mapped Bushes. Live Stem Classes								Total Mapped ing. Bushes	Fruit- ing. Bushes	Addi- tional Small Un- mapped Seed- lings	Mapped Ribes by Species			
					0-4"	5-11"	12-35"	36-71"	61-119"	12-241"	251-4	R. roez.				R. nev.	R. vis.		
Forest	Shaver Timber	8/10	1939	403	56	459	80	95	61	29	12	3	1	281	-	482	225	34	22
	Blue Canyon	8/11	1940	19	51	70	20	25	18	3	1	-	-	67	-	19	67	-	
	Pilot Peak	8/9	1940	90	147	237	5	20	30	22	7	2	-	86	-	2	86	-	
Sierra	Siguel Peak	6/18	1939	138	634	772	17	54	105	48	26	8	-	258	18	***	258	-	-
	Inter-Road**	7/26	1943	31	62	93	5	9	9	4	2	2	-	31	1	6	30	1	-
	Gentle Gully	7/27	1943	113	185	298	15	58	41	17	8	2	-	140	1	182	69	71	-
Pinus	Rock Creek	7/29	1940	21	43	64	17	13	13	3	2	-	-	48	-	54	24	24	-
	Taniant	7/22	1940	16	19	35	7	2	7	2	1	-	-	19	-	3	19	-	-
A v e r a g e s				104	150	254	21	34	36	16	7	2	-	116	3	93	97	16	3

\*CSS = Current season stem, OLS = Older live stem, and TLS = Total live stem.

\*\*First post-eradication inspection!

\*\*\*These data not recorded.

TABLE 7

SUMMARY OF RIBES EXCLOSURE PLOTS, 1941-1943. ALL SUBPLOTS OF EACH SERIES CONSIDERED  
AS ONE PLOT

Item	Chowchilla Mt. Exclosure (Sierra N.F.)			Cow Creek Exclosure (Stanislaus N.F.)			Big Bar Mt. Exclosure (Plumas N.F.)			Lake Almanor Exclosure (Plumas N.F.)		
	8/18 1941	9/15 1942	9/13 1943	8/13 1941	9/12 1942	9/11 1943	9/2 1941	8/4 1942	7/25 1943	9/1 1941	7/30 1942	7/21 1943
Size	910	250	53	339	333	86	17	43	16	78	525	294
1-1.9"	128	163	59	251	169	67	29	20	36	86	122	112
2-3.9"	7	119	69	48	107	56	31	17	35	15	30	55
4-5.9"	1	66	53	4	51	29	5	7	11	-	19	18
6-8.9"	-	29	51	-	49	35	2	11	10	-	7	8
Estimated 9-11.9"	-	16	42	-	15	18	-	7	5	-	3	5
Live Stem 12-35"	-	30	69	-	23	38	-	18	27	-	-	6
Per Bush 31-5.9'	-	13	26	-	1	13	-	5	17	-	-	-
6-11.9'	-	-	18	-	-	3	-	1	5	-	-	-
12-24.9'	-	-	12	-	-	-	-	-	-	-	-	-
25'+	-	-	1	-	-	-	-	-	-	-	-	-
Totals	1,046	686	453	642	748	345	84	129	162	179	706	498
Estimated 1941	1,046	309	288	642	292	151	84	51	50	179	76	70
Years of 1942	-	377	121	-	456	119	-	78	31	-	630	167
Origin 1943	-	-	44	-	-	75	-	-	81	-	-	261
Total Live Stem, Ft.	56.1	221.2	727.3	59.2	158.2	211.0	15.4	79.0	184.2	17.8	59.6	64.3
Aver. Live Stem Per Bush	0.05	0.32	1.61	0.09	0.21	0.61	0.18	0.61	1.14	0.10	0.08	0.13



TABLE 8

## PINE REPRODUCTION ON THE EXCLOSURE PLOTS, 1940-1943

Relation to Fence	Height Classes	Chowchilla Mt. Exclosure (Sierra N.F.)			Cow Creek Exclosure (Stanislaus N.F.)		Big Bar Mt. Exclosure (Plumas N.F.)		Lake Almanor Exclosure (Plumas N.F.)	
		9/13 1940	9/15 1942	9/13 1943	9/10 1940	9/11 1943	8/22 1940	7/25 1943	8/27 1940	7/21 1943
Inside Fence	CSS*	-	-	-	-	-	-	-	-	-
	0-5.9"	11	11	4	-	2	-	-	-	-
	6-11.9"	12	7	9	8	-	-	-	-	-
	1'-1.9'	3	9	8	-	4	4	1	-	-
	2-3.9'	1	2	6	1	1	8	3	-	-
	4-6.9'	-	1	3	-	-	10	1	1	-
	7-10.9'	1	-	-	-	1	6	8	-	1
	11-20.9'	-	1	1	-	1	-	9	-	-
	21-40'	-	-	-	-	-	-	-	-	-
	41'+	-	-	-	-	-	-	-	-	-
	Totals	28	31	31	9	9	28	22	1	1
	SP	13	14	13	1	1	16	9	-	-
	FP	15	17	18	8	8	12	13	1	1
Outside Fence	CSS*	-	-	-	-	-	-	-	-	-
	0-5.9"	1	2	1	-	1	-	-	-	-
	6-11.9"	6	5	2	3	2	1	-	-	-
	1'-1.9'	-	2	6	2	-	-	-	-	-
	2-3.9'	1	-	-	1	2	2	1	-	-
	4-6.9'	-	1	1	-	1	3	1	-	-
	7-10.9'	-	-	-	-	-	-	2	-	-
	11-20.9'	5	5	5	-	-	-	2	-	-
	21-40'	-	-	-	-	-	-	-	-	-
	41'+	-	-	-	-	-	-	-	-	-
	Totals	13	15	15	6	6	6	6	-	-
	SP	10	12	12	-	-	3	2	-	-
	FP	3	3	3	6	6	3	4	-	-

\*Reported figures for this class are believed correct, but CSS (current season seedlings) may not have been recorded as such on tabulations prior to 1943.

TABLE 9

## RIBES REGENERATION ON THE LAKE ALMANOR EXCLOSURE PLOTS, 1941-1943

Item		Lake Almanor Exclosure											
		1941-Origin Ribes						1942-Origin Ribes				1943	
		Inside Fence			Outside Fence			Inside		Outside		In	Out
		9/1 1941	7/30 1942	7/21 1943	9/1 1941	7/30 1942	7/21 1943	7/30 1942	7/21 1943	7/30 1942	7/21 1943	7/21 1943	7/21 1943
Size	0-.99"	54	1	-	24	-	-	233	24	291	51	74	145
Classes	1-1.9"	52	15	4	34	3	4	61	46	43	19	12	27
of Ribes,	2-3.9"	9	17	19	6	11	9	-	15	2	9	2	1
Live Stem	4-5.9"	-	12	11	-	7	5	-	1	-	1	-	-
	6-8.9"	-	4	3	-	3	5	-	-	-	-	-	-
	9-11.9"	-	2	1	-	1	3	-	-	-	1	-	-
	1-2.9'	-	-	4	-	-	2	-	-	-	-	-	-
Total Live Ribes		115	51	42	64	25	28	294	86	336	81	88	173
Dead Ribes		-	64	9	-	39	(3)*	-	208	-	255	-	-
Inches	of Ribes												
Live Stem	CSS	132	-	-	81	-	-	208	-	216	-	61	116
	TLS	132	185	211	81	106	156	208	131	216	97	61	116
Aver. Live Stem,													
Inches Per Bush		1.1	3.6	5.0	1.3	4.2	5.6	0.7	1.5	0.6	1.2	0.7	0.7

\*A small apparent increase of 1941-origin ribes due to some error in inspection.

TABLE 10

## RIBES REGENERATION ON THE BIG BAR MT. EXCLOSURE PLOTS, 1941-1943

Item		Big Bar Mt. Exclosure											
		1941-Origin Ribes						1942-Origin					
		Inside Fence			Outside Fence**			Inside			Outside**		
		9/2	8/4	7/25	9/2	8/4	7/25	8/4	7/25	8/4	7/25	7/25	7/25
		1941	1942	1943	1941	1942	1943	1942	1943	1942	1943	1943	1943
Size Classes of Ribes Live Stem	0-.99"	14	-	-	3	-	-	16	-	27	-	12	4
	1-1.9"	26	-	-	3	-	-	8	-	12	-	21	13
	2-3.9"	20	2	-	11	-	-	5	2	10	5	17	10
	4-5.9"	4	5	-	1	2	2	-	2	-	5	-	2
	6-8.9"	1	7	5	1	4	-	-	2	-	2	1	-
	9-11.9"	-	6	1	-	1	1	-	1	-	2	-	-
	1-2.9'	-	13	17	-	5	1	-	5	-	4	-	-
	3-5.9'	-	4	14	-	1	2	-	-	-	1	-	-
	6-11.9'	-	-	4	-	1	-	-	-	-	-	-	-
Total Live Ribes		65	37	41	19	14	6	29	12	49	19	51	29
Dead Ribes		-	28	(4)*	-	5	8	-	17	-	30	-	-
Inches of Ribes Live Stem	CSS	238	470	1,099	69	257	104	36	81	71	169	69	48
	OLS	-	84	538	-	30	35	-	25	-	42	-	-
	TLS	238	554	1637	69	287	139	36	106	71	211	69	48
Aver Live Stem, Inches Per Bush		3.7	15.0	39.9	3.6	20.5	23.2	1.2	8.8	1.5	7.0	1.4	1.7

\*A small apparent increase of 1941-origin ribes due to some error in inspection.

\*\*The area outside of fence was worked by eradication crews in the early spring of 1943. Some bushes were removed from these subplots.

TABLE 11

## OCCURRENCE OF FRUITING BUSHES ON BURNED PORTION OF COW CREEK 5.6-ACRE PLOT

Year	Date of Inspection		Total Bushes	Total Fruits
	Month & Day		Fruiting	Observed
1941	May 21		40	1,206
	June 3		30	429
	June 18		15	114
	July 11		11	42
	August 13		8	25
1942	June 25		28	423
	Aug. 15		23	252
	Aug. 24		18	198
	Sept. 11		0	0
1943	June 11		57	1,254
	June 21		56	1,206
	July 6		56	1,157
	July 31		53	958
	Aug. 14		15	67

## SECTION II. FIELD WORK IN METHODS OF RIBES ERADICATION FOR 1943

### 1. Toxicity Tests of Ammonium Sulfamate on Ribes roezli and R. nevadense.

Results of 1942 work on R. roezli. On July 25, 1943 a check was made of the milacre R. roezli plots which had been treated July 9 and September 8 with aqueous ammonium sulfamate. Unfortunately a large white fir (apparently struck by lightning) had fallen diagonally across the plots and it was not possible to inspect 100 percent of the ground area of the plots to which the 3- and 5-pound dosages had been applied. On all of the ground area visible 100 percent kill had been obtained. Results are shown in table 1.

TABLE 1

RESULTS OF 1942 SPRAY AND SOIL DRENCH TESTS WITH AQUEOUS AMMONIUM SULFAMATE ON RIBES ROEZLI, CASCADE ROAD PLOTS\*, PLUMAS N.E.

Plot No.	Date Treated	Lbs. Chemical Per Milacre	Ribes		Percent Bushes Killed
			No.	F.L.S.	
1	7/9/42	3	14	275	90**
2	Do.	5	11	275	95**
3	Do.	7	10	350	100
4	Do.	10	11	191	100
5	9/8/42	3	16	330	90**
6	Do.	5	12	385	95**
7	Do.	7	14	300	100
8	Do.	10	10	305	100

\*Soil of the plot area may be described as a gravelly fine sandy loam originating from basalt and metamorphic rock. There was an overstory of mature fir and a fair amount of small limbs and needles on the ground. Ground slope was gentle and westerly. At the time of the September 8 treatment, all ribes on the plots were in full leaf and some ripe fruits remained on the plants.

\*\*Estimated kill not less than figure shown and may have been close to 100 percent.

The ammonium sulfamate sprays appeared to be sufficiently effective on Ribes roezli to justify further tests under other soil conditions. No seedlings were found on the plots.

1943 tests on R. roezli and R. nevadense. On August 6 four milacre plots of R. roezli were established on a branch of Laurel Creek about 4 chains above the Pine City Mountain Road, Sierra National Forest. Aqueous ammonium sulfamate at 1 pound per gallon of water for dosages of 2 and 4 pounds per milacre and 1-1/2 pound per gallon for dosages of 6 and 10 pounds per milacre was applied as a combination top spray and soil drench.

Seven large R. nevadense, just above the road on Laurel Creek, were staked and given crown applications of ammonium sulfamate (1-1/2 lbs. per gal. of water). Dosage varied from 1 to 2 quarts of solution per crown according to the size of the bush. These ribes were rockbound and would have been troublesome and costly to eradicate by pulling or grubbing. Final data for these tests will be available early in the summer of 1944.

## 2. Results of Oil Tests, Milacre Series.

Results of dosage tests of Diesel oil and new oil mixtures on small Ribes roezli plants and the effect of oil on the subsequent regeneration of ribes were again noted in 1943. Chowchilla Mt. plots were checked on June 16. Results of this check are given in table 2 and show: (1) The 10-gallon dosage of oil kills 100 percent of ribes on the ground and precludes reestablishment of ribes over a 5-year period; (2) the 3- and 5-gallon dosages were practically 100 percent effective and kept out significant numbers of ribes seedlings for two years; (3) since 1941 the controls have been nearly as devoid of new seedlings as the oil-treated plots. This is partly explained by the presence of a substantial ground cover of established non-fruited bushes on the control plots and partly to the lack of disturbance of the ground.

The Boggy Meadow oil plots were checked on August 9. These plots have all remained substantially free of ribes seedlings since 1941 although they have been subjected to considerable trampling by cattle. Data for the Boggy Meadow plots are shown in table 3.

TABLE 2

RESULTS OF 1938 DOSAGE TESTS OF NEW OIL MIXTURES ON SMALL RIBES ROEZLI BUSHES, CHOWCHILLA MT.,  
SIERRA N. F., CALIFORNIA - SUMMARY OF DATA 1938-1943

Plot No.	Dosage in Gals. Per Milacre	Oil Mixture Used	1938		Current Season Seedlings					Total Fruiting Bushes Removed 1939-43	Non-fruiting Bushes Over One Yr. Old, 1943 Check
			Number Bushes on Plot	Percent Bushes Killed	1939	1940	1941	1942	1943		
					1939	1940	1941	1942	1943		
28	0.5		195	90	15	13	8	7	-	4	10
1	1.0		43	93	-	-	-	-	-	2	-
2	1.5		105	96	2	4	-	-	-	4	-
3	2.0	SO <sub>2</sub> Extract	55	100	-	2	2	-	-	-	2
4	3.0		70	100	-	-	-	-	-	-	-
5	5.0		137	99	-	-	-	-	-	1	-
6	10.0		94	100	-	-	-	-	-	-	-
7	1.0		18	83	1	-	1	-	-	2	-
8	1.5		85	96	8	-	-	2	-	1	-
9	2.0	Diesel Oil	76	93	4	-	4	-	-	1	1
10	3.0		56	100	-	-	-	-	-	-	2
11	5.0		59	100	-	-	-	-	-	-	-
12	10.0		35	100	-	-	-	-	-	-	-
13	1.0		58	71	54	26	15	18	-	4	10
14	1.5	Diesel Oil	94	91	17	9	1	3	-	5	3
15	2.0		21	81	9	13	-	3	-	2	2
16	3.0	+	109	100	1	-	-	-	-	-	-
17	5.0	Crude Oil	110	95	1	8	-	-	-	5	1
18	10.0		65	100	-	-	-	-	-	-	-
29	0.5		57	100	24	38	1	-	-	-	-
19	1.0	SO <sub>2</sub> Extract	77	92	93	46	2	3	-	5	8
20	1.5		210	94	22	14	-	-	-	8	6
21	2.0		23	96	7	36	-	-	-	-	3
22	3.0	Diesel Oil	46	100	3	3	1	-	-	-	1
23	5.0		127	100	-	5	-	-	-	-	-
24	10.0		135	100	-	-	-	-	-	-	-
25	0.0	Control	209	None	87	41	-	-	2	39	97
26	0.0		25	None	137	96	1	3	-	24	6
27	0.0		170	None	81	15	7	-	-	51	111



TABLE 3

1943 SUMMARY OF RIBES ROEZLI SEEDLING OCCURRENCE ON PLOTS TREATED WITH  
VARIOUS DOSAGES OF DIESEL OIL, BOGGY MEADOW, SIERRA N.F., CALIF.

Plot No.	1937 Dosage Gals.Oil Per Acre	Notes on Number of Seedlings in 1938	Total Seedlings 1939-42 Inclusive	Number of Ribes at 1943 Inspection	
				1942 Bush or Older	1943 Origin Seedlings
1	0.5	Numerous	255	0	0
2	1.0	Few	270	2	0
3	1.5	Few	54	0	0
4	2.0	None	133	0	0
5	3.0	None	84	0	0
6	5.0	None	9	2	0



### SECTION III. LABORATORY AND GREENHOUSE WORK

The laboratory, greenhouse, and Ribes Garden at Berkeley were actively maintained throughout 1943. In September arrangements were completed with the School of Forestry, Moscow, Idaho, for office, laboratory, and greenhouse space to be occupied and used for disease and methods work by C. R. Stillinger under the supervision of V. D. Moss. Greenhouse tests on the direct seeding of western white pine will be in progress early next year.

Special activities at Berkeley and at Spokane during the year have included: (1) Germination tests on ribes on western white pine and sugar pine seed; (2) germination tests on poison oak seed and toxicity studies on the sterilizing action of boron on Camp Adair soils; (3) greenhouse tests with sodium chlorosulfonate, ammonium sulfamate, and other chemicals, as possible herbicides for ribes eradication; (4) pH determinations on 27 samples of soil from Kaniksu light-moisture plots; (5) chemical tests for identification of cankers on western white pine and sugar pine; (6) determinations of moisture equivalent and wilting point percentages of 27 soil samples from the Kaniksu plots and of over 100 soil samples from problem areas in the Sugar Pine Region; (7) construction of special apparatus for soils work and for wilting point tests by the barium nitrate equilibrium method; (8) statistical analysis of field methods data from Idaho and of data from Ribes and pine seed germination tests at Berkeley. Such 1943 data as are now available on the above topics are included in the following special reports which were prepared and made available to Blister Rust personnel during the calendar year of 1943:

Serial No. 116 - EXPERIMENTAL GERMINATION OF RIBES SEEDS. SERIES OF 1942.

.....C. R. Quick

Serial No. 117 - EFFECTS OF DENSITY OF PLANTING ON GROWTH IN THE GREENHOUSE OF RIBES ROEZLI SEEDLINGS.

.....C. R. Quick

Serial No. 118 - STATUS REPORT ON REAGENTS AND METHODS AS FIELD AIDS IN DISTINGUISHING BETWEEN DISEASED AND NORMAL WHITE PINE TISSUE AND BETWEEN ROOTS AND UNDERGROUND STEMS OF RIBES.

.....H. R. Offord

Serial No. 119 - THE EFFECTS OF CEANOTHUS CORDULATUS (SNOWBRUSH) SEEDLINGS ON THE GROWTH OF RIBES ROEZLI (SIERRA GOOSEBERRY) SEEDLINGS.

.....C. R. Quick

Serial No. 120 - EXPERIMENTAL GERMINATION OF RIBES AND PINE SEEDS - SERIES OF 1943.

.....C. R. Quick

Spokane Office (Methods and Operations) - SIZE OF CREW, WIDTH OF STRIP, AND METHODS OF LAYING STRING.

.....Virgil D. Moss (in cooperation  
with St. Joe  
operation)

Bureau MS No. 6835 - CERTAIN METHODS OF FORCING THE GERMINATION OF SEEDS. Journ. Calif. Hort. Soc., Vol. IV, 3:95-102 (1943)

.....C. R. Quick

















